The relationship between single mothering and adolescents' sexual behaviour in black families in urban South Africa: a retrospective analysis of the Birth to Twenty cohort

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DECLARATION

I Siphosenkhosi Nathaniel Dlamini declare that this thesis is my own work. It is being submitted for the degree of Doctor of Philosophy in the University of the Witwatersrand, Johannesburg. It has not been submitted before in any other form for any degree or examination at this or any other University.

Signature…….

Date……..

DEDICATION

First of all I want to thank God for giving me the strength to carry on and finish this thesis. I would like to thank my family and the person closest to me for their support.

Secondly, I want to thank my son Scalo for being so understanding when his dad was away pursuing his PhD studies.

ABSTRACT

In South Africa, children are more likely to grow up in a single mother family than in any other family structure. A single mother refers to a mother who is living with children younger than 18 years of age and who is neither married nor living with a partner. A recent report by Statistics South Africa (2012) showed that at national level, in 2011, there were more children (42.5 %) aged below 5 years that lived with their biological mother only. And almost half (45.6 %) of those children are black African children. At the beginning of the Birth to Twenty cohort study, of the 3273 mothers and their children who were enrolled in the study, 1800 (almost 55 %) of them were single mothers and about 80 % (1440) remained single 10 years later. A wealth of research conducted abroad shows that children growing up in single mother families are associated with sexual behaviour that may jeopardise their well-being.

South Africa provides an important setting in which to explore the relationship between single mother families and their children's sexual behaviour because of the statistics shown above. There is currently little knowledge about the relationship between the duration and timing of exposure to single mother families and the age of first sex for children. This thesis attempts to address this research gap. Retrospective data from the Birth to Twenty cohort (Bt20) was used to investigate whether there is an association between single mothering and adolescent sexual behaviour in the South African context, and to examine the impact of the duration and timing of exposure to single mother families for both adolescent males and females. Lastly, it sought to test mediating factors such as father and extended family involvement and other characteristics of the mother, like educational attainment and the age at which she had the child, on the relationship. Of the 3273 children and their mothers enrolled in the study in 1990, 1145 mother and their children were selected for this study and the children were 19 years of age at time of interviews.

The study found that the average ages at first sex for children who have spent their entire lives in single mother families (fully exposed) and those who have always been in two-parent families (never exposed) are not significantly different from each other. Children who have been in single mother families for only some of their lives showed lower average ages at first sex, which suggests that they are more likely to start being sexually active at an early

age than the other two groups. Children who were found to have spent more time (more than 9 years) in single mother families than in two-parent families were found to be at higher risk than those who have been in two-parent and single mother families all their lives. When children have been partially exposed to single mother families before age 11, they are also more likely to engage in sexual activities than those who have been either fully exposed to or not exposed to single mother families at the same age. After controlling for demographic and socio-economic backgrounds, we found that maternal factors also have an impact on the age at which children start having sex. Children were found to be more likely to become sexually active before age 18 if they were born to a younger mother or a mother who had only primary education or no formal education. In addition, boys were found to be twice as likely to engage in sex by age 18 than girls, and were more than seven times likely to engage in sex by age 15, keeping all factors constant. Non-resident father contact and financial support are crucial determinants of delayed sexual activity at all developmental stages, and extended family support is important in early and late childhood.

In conclusion, the main finding of this thesis is the importance of partial exposure to single mother families. Children who have been partially exposed to single motherhood were found to be at a higher risk of initiating sex earlier. This also shows how the instability of family structure might be a factor in adolescent sexual onset and this affects both boys and girls equally and at all developmental stages, despite the fact that boys are more prone to engage in sex at an early age than girls.

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Chapter 1

1. Background and significance of the study

1.1 Introduction

This study examines the relationship between exposure to single mother families and age at first sex in black families in Soweto Township in South Africa. A single mother is defined as a mother who lives with her children who are younger than 18 years, who is neither married nor living with a partner. South African studies have shown that black children growing up in South Africa are likely to spend some time in single mother homes during their childhood and adolescence because of the decline in black marriage rates owing to late marriage, high divorce rates and high male deaths, partly due to HIV-related illnesses (Amoateng, Richter, Makiwane and Rama, 2004; Hosegood, McGrath and Moultrie, 2009). About half of black South African women between ages 15-49 years do not marry or marry late, increasing the chances of premarital sex and possibly premarital births (Amoateng, Heaton and Kalule-Sabiti, 2007; Panday, Makiwane, Ranchod and Letsoalo, 2009). An analysis of Birth to Twenty (Bt20) illustrates that 80 percent of single mothers who had enrolled in the study after the birth of their child, remained unmarried ten years later (Richter, Cameron, Norris, Del-Fabro and MacKeown, 2004). One of the reasons that may partly explain the decline in marriage rate is men's inability to pay dowry [lobola] and to fulfil the role of provider (Hunter, 2006).

Apart from the low marriage rates, divorce is another contributor to single motherhood. Recent survey statistics indicate that there has been a remarkable increase in divorce rates for black South Africans between 2002 and 2008, exposing more children to single mother families (Statistics South Africa, 2012). Given the prevalence of single mothers, divorced mothers are more likely to raise their children without the presence of their biological fathers. Data from the South African Demographic Household surveys between 1993 and 2002 shows an increase from 36% to 45.8% of children with absent living fathers (Posel and Devey, 2007).

High mortality rates among males have the effect of not only making children orphans and vulnerable to poverty but also exposes them to single mother families or step-parent families, as many children will be raised either by single mothers or by 'fathers' who are not their biological fathers but men who will be fulfilling the fatherhood role e.g. stepfathers, uncles, grandfathers etc. (Amoateng, Richter, Makiwane and Rama, 2004; Morrell, Posel and Devey, 2003; Richter and Morrell, 2006). In 2002, almost 57% of all children, and 63% of African children, were reported as having absent or deceased fathers (Posel and Devey, 2007). Because of high adult male mortality rates due to AIDS, there are greater chances that marriage may end through death than through divorce (Amoateng*, et al.*, 2004). The AIDS pandemic has weakened family structures and raised much concern about the issue of fatherhood (Amoateng*, et al.*, 2004).

Low marriage rates, high divorce rates and high male mortality increase the chances of being a single mother in South Africa. Research conducted locally and abroad has linked adolescent sexual outcomes to variations in family structure. This study assesses the relationship between single mothering and age at first sex.

1.2 Statement of the problem.

The emphasis on children living with single mothers has been intensified by research conducted in South Africa and abroad. Research findings have shown that when children are not raised by both parents or have disruptions in family structure, they are likely to initiate sex earlier (Ellis, Bates, Dodge, Fergusson, Horwood, Pettit and Woodward, 2003; Panday, *et al.*, 2009; Quinlan, 2003). With regard to the high HIV infection rates among adolescents aged 15-20 years of age, the high fertility rate among those under 18 years of age, which constitute more than a third of annual births, and with the common features of rape, violence and coercion in adolescent sexual behaviour, adolescents' sexual behaviour has been a primary concern and has received much scholarly attention in South Africa (Panday, *et al.*, 2009). When young people engage in sexual intercourse early in their lives they significantly increase the risk of early pregnancy and of contracting HIV/AIDs (Panday, *et al.*, 2009).

There is wealth of research from western countries that examines the effects of family structure and adolescent sexual behaviour. Literature from the US has shown that there is a strong association between single mother families and the early sexual behaviour of adolescents, as single or divorced parents are perceived to have more permissive attitudes and values towards their children's sexual behaviour (Dittus and Jaccard, 2000). According to the literature, children born to mothers who are not married have a high chance of growing up in single mother family, experience changes in living arrangements, live in poverty, and engage in sex at younger ages and have premarital births(Carlson, Marcia and Corcoran, 2001; Cherlin, 1999; Deleire and Kalil, 2002). Low socio-economic status and lack of parental control and supervision are some of the causal factors that determine the sexual behaviour of children in single-mother homes (Carlson, Marcia and Corcoran, 2001; Cherlin, 1999; Deleire and Kalil, 2002). Children born to single mothers are more likely to experience economic instability and be poor, partly because divorced mothers and their children undergo many changes in residence and experience both loss of social status and loss of support (McLanahan and Booth, 1989). Single mothers are more likely to live in disadvantaged or poor communities that are socially isolated from mainstream society than are married mothers (McLanahan and Bumpass, 1988).

McLanahan and Bumpass (1988) who did their research in the United States provide three major explanations why children in single mother families have higher chances of initiating sex earlier, become pregnant, and become single mothers themselves. First, economic deprivation may affect children's general perception of their parental household and may force children to leave school in order to look for employment and contribute money to the household. Adolescent females from families with low socio-economic status may see engaging in transactional sex as means of escaping poverty. Secondly, lack of adolescent socialisation, parental supervision and social control in single mother families makes children more likely to be affected by peer pressure than children in two parent families, which may lead to earlier engagement in sexual intercourse (Hill, M, Yeung and Duncan, 2001; McLanahan and Bumpass, 1988). Lastly, McLanahan and Bumpass (1988) further argue that stress caused by parental divorce or remarriage may force children out of their family into assuming adult roles and becoming sexually active. At this stage it is not clear to what extent to these facts hold for the South African urban context. However, a cross

national study which analysed the effects of poverty and family structure on social risks and psychological adjustment between African American and black South African 6 year olds found that poverty and gender of the child were confirmed as risk factors but single mothering was not (Barbarin, 1999).

1.3 Aims and objectives of the study

In this study, I investigate the relationship between exposure to single mother families and age at first sex. I examine, 1) the pattern of exposure to single mother families over the early life course of children; 2) the relationship between exposure and age at first sex for both boys and girls, and 3) the extent to which non-resident fathers and extended family members' involvement and socio-economic status mediate the relationship. My data comprise all black children in the Bt20 study that began in 1990 in the Soweto area. At the time of the retrospective interviews all the children were 19 years old. My conceptual framework is rooted in the role of social control and economic hardship in understanding the influence of single motherhood on adolescent sexual behaviour.

1.4 Research Questions

This thesis seeks to answer these specific research questions:

1) Is there a relationship between exposure to single mother families and age at first sex?
    a. Do maternal factors (education and age of mother at birth of the child), father and extended family involvement have an effect on the relationship between exposure to single mother families and children's sexual behaviour?

2) What effect does the duration of exposure to single mother families have on the child's sexual initiation?
    a. Is there a difference in sexual behaviour between children who have been fully exposed (have lived in a single mother family all their lives), partially exposed (have lived in both two parent and single mother families) and those who have never been exposed to single mother families?

3) What effect does the timing of exposure to single mother families have on a child's sexual initiation?
    a. Is there a difference in sexual behaviour between children who have been exposed to single mother families at early childhood (0-5 years), middle childhood (6-11 years) and late childhood (12-18 years)?
4) What effects does duration and timing of exposure to single mother families have on boys and girls?

1.5 Significance of study

Even though Birth to Twenty (Bt20) research is prospective, mothers were asked to reflect on the past yet the adolescents answered prospectively on their sexual behaviour. This study therefore extends the scope of existing studies by measuring retrospectively the chances of engaging in sexual activity by 18 years for children who have been fully exposed, partially exposed and not exposed to single mother families. The study also tests whether the duration and timing of exposure to single mother families throughout early and late childhood has an impact on the sexual behaviour of both males and females. Despite overwhelming research on the effects of living with a single mother, very few studies have examined the relationship between the duration and timing of exposure to single mother families through early to late childhood, and sexual behaviour for both female and male in South Africa. Most research has focused on female sexual outcomes only. Few studies have also considered the effects of extended family members' contributions to a child's upbringing and in influencing their sexual behaviour. This study will help assess the utility of existing conceptual frameworks for the urban South African context which will help us understand factors that can help address issues related to adolescents' entry into sexual activity and which may also help address problems related to teenage pregnancy, and protect them against contracting HIV/AIDS. Uncoordinated intervention strategies by different sectors of society in trying to solve issues pertaining to adolescents' entry into sexual activity may not solve the problem but what is required is a comprehensive point of view that will incorporate, most importantly, families and communities where these adolescents grow up. Onset of sexual intercourse is determined by a combination of many

associated precursors. A retrospective data analysis may provide necessary information required to target an intervention at a specific developmental stage of adolescents. Family variables play a significant role although they do not account for all the variance. Moreover, the effect of family context is likely to vary by development stage of the child. The findings of this research may provide policymakers with information that may assist them to identify factors to focus on when dealing with adolescents' sexual behaviour.

1.6 Outline of the thesis

Chapter 2 reviews the existing literature on family structure and adolescent sexual behaviour and focuses on two theoretical orientations: social control and economic hardship theory. It compares common family systems available in South Africa and discusses negative and positive perspectives of single and two parent households. It also presents the hypotheses and conceptual framework for family structure and sexual behaviour of children in this study.

Chapter 3 provides an overview of the site and data description, methodology and analytical framework.

Chapter 4 presents a descriptive analysis using ANOVA [Analysis of Variance] on sexual behaviour and various aspects of children's experience with single motherhood over the life course and its effects on boys and girls. It shows the demographic characteristics of the mother and bivariate analysis of predictor variables and outcome variables.

Chapter 5 presents the results of this analysis using survival analysis and binary logistic regression that seek to answer the first research question: is there an association between sexual behaviour and exposure to single mothering. It also incorporate measures of father involvement and the extended family to determine whether this mediates any effects of exposure to single mother families and children's sexual behaviour.

Chapter 6 discusses the results of binary logistic regression modelling that examines the relationship between sexual behaviour and duration of exposure to single mother families.

Chapter 7 follows by analysing results between sexual behaviour and the timing of exposure to single mother families.

Chapter 8 presents the main empirical findings of the study and its theoretical implications in light of the social control and economic hardship theories, and examines whether these theories fit the data. Policy implications and recommendations for future research are discussed in this last chapter which concludes by addressing the limitations and weaknesses of the study.

Chapter 2

Literature review and conceptual framework

In this chapter various types of families in South Africa and their implication for children's well-being are discussed. The conceptual framework constitutes theories (social control and economic hardship theories) that explain the linkages between single mother families and sexual behaviour. Families in South Africa have been impacted by politics, urbanisation and industrialisation and they have evolved to form non-traditional families, particularly single mother families. Since South African family structures have transformed it is important to define what we mean by a single mother family in the South African context and further discuss the prevalence of mother only families in South Africa in comparison with other selected African countries. We also discuss the relationship between family structures, particularly single mother families, and sexual behaviour. An overview of positive and negative perceptions of single motherhood is provided to give a balanced perspective on the subject of single motherhood. The involvement of the father and extended family as mediating factors are discussed and the conceptual framework is summarised.

2.1.South African family structures

Children in South Africa are growing up in a variety of families, which include families formed by marriage, in cohabiting unions, in lesbian and gay families, and in single-parent families (Amoateng*, et al.*, 2004). Despite the multiple forms of families that many children are likely to grow up in, there are still two family patterns that are common, that is the nuclear and the extended family structures (Amoateng and Richter, 2003). A nuclear family structure is defined as a household that consists of a single family, a couple with or without children but with no other members (Simkins, 1986). On the other hand, an extended family type consists of one family nucleus plus at least one other relative e.g. grandmother or an uncle (Simkins, 1986). The nuclear and extended family forms are identifiable with whites and Africans respectively, and coloureds and Indians (Asians) are a mixture of both (Amoateng and Richter, 2003).

Families in South Africa have been affected by social changes which range from migration, colonisation, modernisation, urbanisation and globalisation (Amoateng*, et al.*, 2004). Many

scholars have been asking the question whether the impact on South African families of modernisation, urbanisation or industrialisation has transformed extended family households to become more like nuclear families (Ziehl, 2001). Although many researchers have supported the claim that the nuclear family structure is growing in proportion, more especially in urban areas, some researchers have contested the view that extended families are transforming into nuclear families resembling the nuclear structure found in the 'West'. Russell (2003a) argues that when making such assertions cultural differences need to be taken into consideration.

However, research shows that these social changes have separated people from their families and encouraged the formation of "non-traditional" families (Amoateng*, et al.*, 2004). These non-traditional families who have become evident in society are single-parent families, childless couples, and there is a growing trend to live in non-family households (Amoateng*, et al.*, 2004). The non-traditional family structures have an effect on children's upbringing. Data from the South African Demographic Health Survey (1998) showed that 32.8 % of children lived with both parents in 1998, while 34.4% lived with mothers only and 25% with neither parent (Table 1). According to the information in Table 1, South Africa (34.4%) had the highest number of black children living with their mothers only when compared to other selected African countries, followed by Namibia (27.3 %).

Table 1:Percentages of children living with mother only, with both parents and with neither parent in different African countries

Countries	Year	Both Parents	Mother only	Neither parents
Kenya	1998	57.9	20.0	9.8
Malawi	2000	60.3	20.9	15.5
Mozambique	1997	59.7	19.5	12.9
Tanzania	1999	62.6	17.3	13.6
Uganda	2000/1	62.4	16.9	14.8
Zimbabwe	1999	45.5	26.3	19.5
Namibia	2000	26.4	27.3	33.1
Nigeria	1999	72.1	10.1	8.8
Zambia	2001/2	61.6	17.8	15.8
South Africa	1998	32.8	34.4	25.0

Source: various Demographic Health Surveys 1997-2002

Namibia has the highest percentage (33.1%) of children living with neither parent. There may be many explanations to these observed trends in Namibia and South Africa, including the effect of apartheid policies and the subsequent move to democracy in these two countries. Another explanation could be the increasing adult illnesses and mortality related to HIV/AIDS in families.

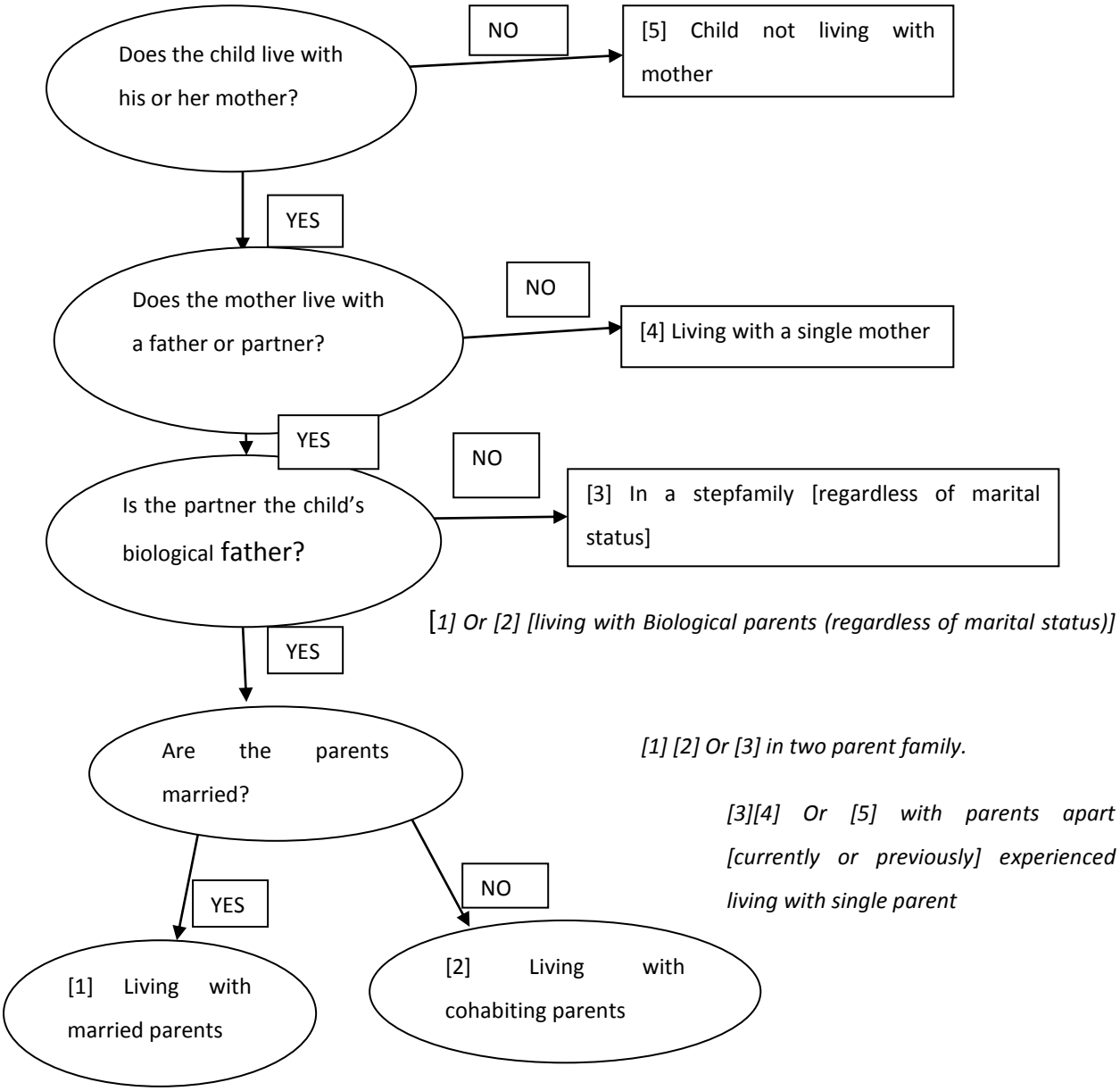
In South Africa, the social, political and economic conditions of colonisation and urbanisation impacted negatively on families by limiting their employment opportunities and the constraints of getting reasonably sized and affordable housing in urban areas (Amoateng*, et al.*, 2004). Apartheid policies and the migrant labour system had far reaching effects on families, particularly on African families (Amoateng*, et al.*, 2004). The extended family networks were fragmented (Simkins and Dlamini, 1992). Apartheid's anti-urbanisation policies required African labour migrants to stay permanently at urban places of employment and they could not migrate with spouses or family members (Posel

andDevey, 2007). This increased the number of female headed households or de facto single mother households in supply areas (Ray, 2000). Female heads, who are sometimes referred to as de facto single mothers in this dissertation, are unlikely to be married, and if married they did not live with their partners (Posel, 2001). Because of the absence of the male partner who is normally considered to be the bread winner, some de facto single mother households are poorer than other households particularly when the single mother stays alone (Budlender, 2003). In other cases a single mother might stay with other family members which means in those instances the extended family structure consists of a single mother and other adults, especially the grandparents (single mother extended family). Such units are not single mother households (Bumpass andRiley, 1995; Madhavan, Townsend and Garey, 2008). However, one may still argue that if the father is not present in such households it is a single mother household even if other adults are present. Such families can be best described as 'single mother extended families' (Madhavan*, et al.*, 2008). This argument leads us to discuss the definition of a single mother and which family structure can be classified as a single mother household and its challenges in the South African context.

2.2 Definition of a single mother

This definition of a single mother is adopted from the work of Heuveline, Timberlake and Fustenberg (2003]. Heuveline et al (2003) illustrate how the following five childhood living arrangements can be used to deduce the definition of a single mother.

Figure 1: Definition of a single mother



Source: (Heuveline, Timberlake andFustenberg, 2003)

Figure 1 shows [1] children living with married parents, [2] cohabiting parents and [3] in step-parent families. All children in [1] or [2] and [3] are in two parents' families and children in [1] and [2] are living with their biological parents regardless of their marital

status. Children in [3] have either lived with parents apart currently or previously or have experienced living with a single mother.

Children in [4] are living with a single mother. In [5] are children who are not living with their mothers. From these living arrangements we therefore define a single mother as a mother who is living with one or more children aged less than 18 years, who is neither married nor living together with her partner or husband (Heuveline et al, 2003). Mothers who are not living with their children and those living with their male partners are not classified as single mothers in this study.

Defining a single mother can be difficult and misleading in South Africa and in many other African societies because being single can be conceptualised differently in many African societies, as much of the difference between cohabitation and marriage cannot be clearly distinguished. In fact in some societies in Africa a couple is considered married if they spend a certain time together and have a child together or when the payment of dowry (bridewealth) has been negotiated (Shell-Duncan andWimmer, 1999). Dowry (*lobola*) can be paid over a period of time (20 years or more) and marriage is not considered complete until the bridewealth has been paid in full (Shell-Duncan andWimmer, 1999). Cohabitation between a woman and a man is often regarded as an unofficial marriage and the differences between cohabitation and marriage are culture specific (Chandler, 1991). To define a single mother using a marital definition can be complicated and misleading at times in the South African context because marriage and cohabitation are not clearly distinguished. A mother can be classified as unmarried yet she is living with a male partner while dowry is being negotiated.

To overcome the problem of reporting cohabitation as marriage, in this work a single mother is defined as a mother with one or more children below the age of 18 years, who is neither married nor living together with her husband or partner, because the presence of a partner excludes the woman from being a single mother. However, this does not mean that children living with a single mother have no contact with fathers or other men (social fathers).

2.3 Implication for children in varying family structures

The African and Western models have different implications for children. In the African context, few children live with both their biological parents (Russell, 2003b). According to Russell (2003), in Southern Africa children are often separated from their biological parents, more especially when the mother is still young and unmarried. Many children spend time with extended family members particularly grandparents, because it is likely to be where they were born or sometimes they are sent to childless relatives (Russell, 2003b). According to the South African October Household Survey (OHS) 1995, nearly three quarters (73%) of all children under seven years who were reported to be not living with both parents were said to be the grandchild of the household head (Budlender, 2003). Russell (2003b) further states that this separation of children from their biological parents affects their emotional relationship. However, if the mothers of those children are still young get the opportunity to continue with school or look for work with the confidence that their children are in safe hands with their relatives. In the west, there is a tendency to rely on non-kin to look after children (Russell, 2003b).

2.3.1 Family structure and children's sexual behaviour

A family is one of the places where learning and socialisation takes place. Discussing families is important because they are a source of human capital development and they also play a role in developing and controlling the behaviour of children (Amoateng*, et al.*, 2004). In many African societies elder members of the family are expected to educate children in the family about their sexuality and children are expected to learn appropriate behaviour that conforms to societal expectations at home (Mudhovozi, Ramarumo and Sodi, 2012). The quality and characteristics of the family have important consequences for child outcomes (Carlson, Marcia and Corcoran, 2001), because the family of origin exerts a strong influence on the age at which men and women become parents themselves (Kiernan and Diamond, 1983). A longitudinal study of 5362 participants conducted in the United Kingdom showed that men and women whose parents had children early are more likely to initiate sex and have children at a relatively early age (Kiernan and Diamond, 1983). Children are more likely to become sexually active before age 14 if their mother started sexual activity at an early age (Mott, Fondell, Hu, Kowaleski-Jones andMenaghan, 1996). Family characteristics are

important in understanding and determining teenage sexual behaviour (Panday, *et al.*, 2009).

Families also provide social and economic support for dependent and vulnerable children (Amoateng*, et al.*, 2004). The literature cited earlier indicates that children from poor families are more likely to initiate sex earlier. Extended families, more especially multigenerational families, may provide a cushion against economic emergencies for single mothers and their children (Bumpass andRiley, 1995). In South Africa, about 17 out of 20 pensioners live in sandwich generation families, making the old age state grant an important source of income in the family (Amoateng*, et al.*, 2004). The presence of other adults, more especially when they are working or bringing some income in families, is crucial in rearing children. In societies where the extended family form predominates it is less likely to find adoption and formal fostering because if the biological parents are unable to look after their children, 'siblings, grandparents and other relatives' step in to assume responsibility for these children (Simkins and Dlamini, 1992). There is a "customary practice" in some African families that allow children who have lost their father or mother to be taken care of by other relatives (Morrell*, et al.*, 2003). If this custom could be practiced universally in many African families it could have an impact on the sexual behaviour of children and it might reduce the burden on the State that arises from failure of families to look after their own(Amoateng and Kalule-Sabiti, 2008).

2.4 Conceptual framework

To extend what has been discussed in the literature, I rely on two prominent theories, the social control and the economic hardship theories, to examine the relationship between exposure to single mother families, the duration and timing of exposure and children's sexual behaviour.

2.4.1 Social control theory

Social control theory views adult supervision as a crucial means by which children are kept from engaging in problem behaviour (Amato, 1993). The key aspects of this view are the number and the types of adults supervising children (Hill, M, S., Yeung, Wei-Jun, J., Duncan, Greg, J., 2001). Proponents of the social control theory view a two parent family as the best

environment for child development (Amato, 1987). In this view a family where both parents are available in rearing the child, they are likely to share the responsibilities of overseeing the the child's activities and in that respect this is seen as a better place for children's development than the single mother family (Amato, 1993; Carlson, and Corcoran, 2001). Both parents are seen to consciously or unconsciously model the sexual attitudes and behaviour of their children (Mendle*, et al.*, 2009). According to this theory the absence of one parent, particularly the father, from the household is seen as problematic for children's socialisation (Amato, 1993; Carlson, Marcia and Corcoran, 2001). Therefore, after divorce or separation many children experience a decline in the amount and quality of contact with the non-custodial parent (Amato, 1987). Research has shown that boys and girls react differently to father absence. Boys are better adjusted when the mother remarries and girls are better adjusted if the mother does not marry (Hill, Yeung, Wei-Jun, Duncan, Greg, 2001). This may be caused in part because in a single mother family social controls are much more relaxed with regard to boys than to girls (Browning, Leventhal and Brooks-Gunn, 2005). In a single mother household girls experience more strict enforcement of behavioural rules than boys because of the perceived social consequences which include pregnancy, child birth, disrupted education and diminished marital prospects (Browning*, et al.*, 2005). On the other hand, boys whose mothers date more often and more quickly after divorce and do not marry have a higher chance of being sexually active than when the mother marries again (Hill, Yeung, Wei-Jun, Duncan, Greg, 2001). The paternal investment theory posits that both daughter's and son's behaviour reacts quickly and positively to the father's family role and parenting behaviour (Mendle*, et al.*, 2009).

Under particular circumstances parenting is impaired in single mother families and there is a lack of social control, which makes children more susceptible to peer pressure, which in turn may lead to sexual involvement (Hill, *et al.*, 2001). Lack of parental supervision brought by parental marital disruptions and more emphasis on peers may increase the chances of children engaging in frequent sexual activity, which may result in premarital pregnancy and births, and early formations of unions (Amato, 1993; Hill, M, S., Yeung, Wei-Jun, J., Duncan, Greg, J., 2001). Children reared by single mothers may also view their mother's sexual activities with a partner to whom she is not married, as meaning that non-marital sex is normative (Mendle*, et al.*, 2009).

The social control theory's emphasis on the number of adults overseeing a child may also suggest that extended families can also provide a good environment for raising children if there are adults present, because social control is thought to increase with the number of adults present in the home. Although it must be noted that stepparents, grandparents and other adults have less power to exercise discipline than biological parents (Hill, M, S., Yeung, Wei-Jun, J., Duncan, Greg, J., 2001).

2.4.2 Criticism of the social control theory

Despite strict parental control, some adolescents, irrespective of their gender and family structure, may still show deviant behaviour and this can be further explained by the social disorganisation theory. The effects of social disorganisation have more impact on single mother families than on two parent families. The social disorganisation theory, which derives from the social control theory, assumes that adolescent sexual behaviour changes when the power older persons had to exert authority and control over younger ones breaks down (Djamba, 1997). The failure by older people and extended family members to control the sexual behaviour of adolescents has been used to some extent to explain the increasing premarital fertility in Africa (Shell-Duncan and Wimmer, 1999). This perspective assumes that education, urbanisation and mass media are factors responsible for making 'traditional social controls' less strict and promoting sexual permissiveness (Djamba, 1997; Toroitich-Ruto, 1990). Although these can affect both two parent and single mother families, single mothers are more susceptible than two parent families because of the reasons mentioned earlier. The social disorganisation theory argues that the exposure of adolescents to western values has resulted in the erosion of traditional moral codes (Toroitich-Ruto, 1990). According to this theory most of these factors are age dependent. For example, exposure to television at age 10 may not have the same effects on the timing of first intercourse as when an adolescent is 17, and also the influence of urban residence can be conditioned by age (Djamba, 1997). Djamba (1997) further argues that the frequency of sexual intercourse is also strongly associated with age.

In the South African context proponents of the social disorganisation theory argue that the relationship between parents and children has changed and parents cannot inflict corporal punishment on their children because of the fear that they could be sued (Zwang and

Garenne, 2008). As a result children have become less responsible to report to their parents or the extended family or any other symbol of authority about their actions (Zwang and Garenne, 2008). Parents have lost their influence and are less respected than before (Zwang and Garenne, 2008). The lack of influence of the extended family system is more evident in urban areas than in rural areas (Meekers, 1994).

2.4.3 Economic hardship theory

This perspective assumes that economic hardships faced by single mothers are primarily responsible for the behavioural problems faced by children. Single mother households are often poorer than other households. Using the South African 2002 General household survey, Dlamini (2006) found that partnered mothers showed better education levels (tertiary education) and higher proportions in professional occupations compared to single mothers who showed high proportions in low education levels (less than secondary education) and dominated elementary occupations. Two parent households with fathers present are better off than single mother households, partly because the couple can pool in resources. Men generally bring more income into the household than women when they are employed, and they may also be able to access other resources from the community that can benefit their children's cognitive and social development by using their status as men (Richter, 2007). Single mother's families also have more limited networks compared to two parent households (Richter, 2007).

Children who live apart from their fathers face a number of economic and social difficulties that seems to increase the risk of sexual behaviour problems compared to those with both parents (Hawkins, 2007). The advantage of being in a two-parent household is that married mothers may decide to spend less time out of the home at work, and to care for children, although this action may be detrimental in the long run because it creates economic dependence on husbands, and wives are less likely to be economically self-sufficient than men when a marriage ends (Cherlin, 1999). After divorce family income may drop substantially and rise again when the mother remarries (Amato,1993; Hill, M, S., Yeung, Wei-Jun, J., Duncan, Greg, J., 2001). A decline in the standard of living may compel adolescents to leave school in order to take a job to contribute economically to the

household (Amato, 1993; Geronimus and Korenman., 1992). Children from disadvantaged single mother households are more likely to assume adult responsibilities at an early age and they are more likely to be working and not attending school (Moser, 1993). School enrolment has been found to protect adolescents against early pregnancy because young women are less likely to be sexually active, less likely to start child bearing or marry early and are more likely to use contraceptives compared to those who are not in school (Grant and Hallman, 2008). Children from poor families are more likely to drop out of school because of lack of money and thus limit their chances of getting a better job and living a better life, which may perpetuate intergenerational poverty (Panday, *et al.*, 2009). Research conducted in South Africa and abroad shows that children from financially struggling families are likely to have lower educational and economic achievements when they reach adulthood because they may have been brought up in areas that offer less opportunities and by poor families (Panday, *et al.*, 2009; Richards and Schmiege, 1993).

Rational adaptation theory, which can be associated with economic hardship theory, argues that adolescent females may use sexuality and pregnancy as a rational strategy to achieve financial and social goals (Al-Azar, 1999; Shell-Duncan and Wimmer, 1999). Poor women when they struggle to meet their immediate material needs may engage in transactional sex with older men in a rational strategy to cope with poverty and marginalisation, and make a trade-off between health and economic security (Al-Azar, 1999; Panday, *et al.*, 2009). The rational adaptation theory distinguishes between two groups of female adolescents, those for whom sexual activity is a rational choice but who do not intend getting pregnant or being married, and those females who may enter into a relationship with older men or sugar daddies to obtain money for school fees or other expenses (Al-Azar, 1999). The other group constitute adolescents for whom pregnancy in itself is a rational strategy to facilitate marriage, creating emotional ties to a man or improving marriage prospects by proving fertility (Al-Azar, 1999; Barker andRich, 1992; Meekers, 1994). This may happen in spite of evidence that birth out of marriage can reduce chances of getting married. In the Birth to Twenty cohort a large proportion (88 %) of women reported that their partners wanted the baby and almost half (46%) of them were going to get married as a result of the pregnancy (Richter, 1996). Findings of the study showed that 5% of women changed their marital

status between the birth of the child and when the child was one year old, and that most became single rather than married (Richter, 1996).

When young women are involved in a relationship with older men, the power imbalance gives men the flexibility to decide the conditions under which sex should occur and more likely this involves coerced or forced sex (Panday, *et al.*, 2009). Socio-economic disadvantages significantly raise chances of a range of unsafe sexual behaviour for females; these may include earlier sexual debut, multiple partners, forced sex or rape at first sexual encounter, engaging in transactional sex in their lifetime and low levels of condom use (Hallman, 2004; Panday, *et al.*, 2009). Another factor related to poverty that may also expose children from poor families to the risk of earlier sexual initiation is the community where adolescents live, which may play a role in influencing their rational decision to engage in sexual intercourse. Living in poor neighbourhoods may facilitate the entry of the adolescent into delinquent subcultures (Amato, 1993). The social disorganisation theory suggests that poor communities are characterised by sexual behaviour norms that lack the sense of restraint or responsibility and these enforced norms are conducive for adolescent deviance (Hogan and Kitagawa, 1985). Poor communities lack the sense of social cohesion that allows informal social control as well as behaviour by adults members that is worth emulating, which can have an influence on the sexual behaviour of adolescents (Panday, , *et al.*, 2009). As a consequence residents of those poor communities are expected to initiate sexual intercourse at earlier ages and to have higher rates premarital pregnancies than other adolescents (Hogan and Kitagawa, 1985). Social disorganisation further states that in communities where young people have low aspirations for economic security because they cannot complete school or find work, are likely to disregard the costs of falling pregnant and of HIV/AIDS (Kaufman, Clark, Manzini and May, 2004). High unemployment, low levels of education and income, high rates of crime and poverty in a community increases the chance of early sexual encounters for both males and females and of a higher rate of unprotected sex (Panday, *et al.*, 2009).

On the other hand, girls who grow up better off and in families with fathers present are more likely to delay sexual initiation compared to those in poorer families (Ellis, Bates, Dodge, Fergusson, Horwood, Pettit and Woodward, 2003; Madise, Zulu and Ciera, 2007). A

study by Madise *et al* (2007) found that wealthier female adolescents were more likely to delay sexual debut and were most likely to have used a condom during their last sexual act. The association between wealth status and age at first sexual intercourse among males was found to be weaker and perhaps because in some cases the main motivation for first sex may be curiosity or experimentation. Sometimes displaying sexuality and power over girls may prove to boys that they have become men. Boys with the desire to become men may be pressured by the peers to establish such claim by engaging in early sex (Morrell, 2006). A summary of the theories and their perspective on single mothers is presented in Table 2. In this section we have discussed the economic hardship and social control theories and explained how family structure, low socio-economic status, gender and father involvement interact to influence the adolescent's age at first sex. All the theories inform the study and contribute to the conceptual framework.

Table 2: A summary of theories and their views on single mothering

Theory	Definition	View of single mothering
Social Control Theory	Children's supervision is crucial and reduces the inclination to indulge in sexual behaviour. It emphasises that the number of adults overseeing the child is essential. A two-parent family is seen as best environment for raising children.	Single mothers experience task overload and children's supervision can be impaired, which may lead to children succumbing to peer pressure and initiating sexual activity early. A single mother extended family provides a better environment for child rearing than a single mother only family.
Economic Hardship theory	This perspective associates poverty and sexual behaviour.	Children from poor single mother families are likely to initiate sex earlier than those from wealthy families.

Source: Author

Although not all authors agree with these theories, and some argue that there are negative perceptions about single motherhood.

2.5 Negative perceptions of single motherhood

Baden *et al* (1998) blame society for the tendency to identify single mother families with dependent children as disadvantaged households (Baden, Hasim and Meintjes, 1998). They argue that negative attitudes by society towards mother-headed families stem from societal disapproval or lack of faith in women's ability to execute leadership (Kissmann and Allen, 1993). This pessimistic view of single mother-headed households associates children

brought up in such families with crime and delinquency (Kissmann and Allen, 1993). Kissmann and Allen (1993) further argue that the majority of single mother families do as well as two parent families when compared on measures of 'emotional adjustment' and 'scholastic achievement'.

Research also shows that there are other problems faced by single mothers and their children in some parts of Africa. They are sometimes socially excluded because of the stigma attached to women who live alone (Gage, 1998). Gage (1998) found that in Kenya, single mothers are considered an 'embarrassment' for being unmarried and they are isolated by their biological families and society and are sometimes labelled as 'harlots', particularly if they live on their own. According to Gage (1998) most of these single mothers felt humiliated and dishonoured. Unmarried mothers in Kenya are also ostracised by society and their families in terms of economic support, although this is not universal in all societies. For example among the Luhya in Kenya, single mothers are able to ask for economic support and child rearing assistance from parents and other relatives.

In South Africa, unlike some other African countries, there is child support grant for single mothers. However, South African women still have lower labour force participation and income than men, making single-mother households vulnerable to poverty (Amoateng*, et al.*, 2004). Poor mothers in general rely on social institutions for state welfare to accommodate their need to care for their children (Mills, 2003). Before 1994 in South Africa apartheid policies excluded some families across racial lines from welfare service provision, which exacerbated the poverty of single mothers in South Africa (Sunde and Bozalek, 1995). However, there is a general public perception that the child support grant encouraged teenage childbearing because teenage girls engaged in sexual activity and fell pregnant primarily to benefit from the child support grant. On the contrary, studies have found no significant associations between the child-support grant and the trend in teenage childbearing in South Africa (Makiwane, 2010). Despite the negative public views of single mother families in certain societies some scholars have started focusing on the strengths of single mother families.

2.6 Positive perceptions of single motherhood

Studies show that with the absence of the father and within the context of a positive mother-child relationship, the power structure in single parent households is less likely to be 'hierarchical' but is more likely to be 'permissive' and 'democratic'(Chandler, 1991). In a qualitative study conducted in the United States one single mother commented:

"I think just communicating with my kids and listening to them and letting them make decisions and giving them choices ... They're very independent and responsible and they have very high self-esteem. I think I've helped them reach their potential and be good caring kids". (Richards andSchmiege, 1993)

Maternal support is dependable and constant in single mother households (Amato, 1987). Children in single mother families are subject to high parental demands and may benefit from increased levels of responsibility (Amato, 1987). In single mother families, the more closer adolescents are to their mothers and the more the mother appear disapproving about their engagement in sexual intercourse, the less likely adolescents were to initiate sexual activity or fall pregnant (Dittus and Jaccard, 2000). However, some single mothers admitted that single parenting becomes difficult and children become harder to manage as they grow older (Richards and Schmiege, 1993).

In the same qualitative study, Richards and Schmiege (1993) found that most single mothers complained about role and task overload and most of them admitted that single parenting becomes easier with time. They also identified five family strengths: parenting skills, managing a family, communicating, growing personally, and providing financial support. Parenting skills involved being supportive of the children, being patient, helping children cope, and fostering independence. Family management strengths included being well organised, and dependable. Good communication included building a sense of honesty and trust, conveying ideas clearly to family and friends, and helping children make decisions and giving them choices.

Not all single mothers are poor and unable to provide for their families. Some single mothers are well-educated and well employed. Single mothers are able to support their families financially without the help of husbands feel a sense of pride; for example one mother commented:

> "I found that I could take care of myself and my daughter without relying on someone else. I did not go to my parents for financial assistance or anyone, and I felt good that when I had a minor crisis I was able to work it through and take care of it myself".(Richards and Schmiege, 1993)

In Agincourt and some other parts of South Africa marriage is not a precondition for having children, a woman can have a child if she can provide for her own economic well-being and that of her children (Kaufman, Wet and Stadler, 2001). In the Agincourt focus groups, some girls expressed negative attitudes about getting married, citing reasons that they do not want to be bullied and abused by men in marriage (Kaufman*, et al.*, 2001). Some women who have achieved professional status or financial autonomy choose to be single and unattached because they do not want to experience the financial and emotional drain imposed by some husbands (Preston-Whyte and Zondi, 1992). Children growing up with educated and financially autonomous single mothers are less likely to engage in sexual activities at an earlier age than their poor counterparts (Madise*, et al.*, 2007). Research in South Africa has shown that wealthier people have more social support and social networks than poor people (Amoateng*, et al.*, 2004). Single mothers who are financially well off are more likely to have extensive networks that can benefit their children. Single mothers with financial autonomy are more likely to stay in communities where community members have high aspirations and are achievers in terms of education, income and employment and are more likely to emphasise the need for education and pursuing higher career goals and avoiding earlier sexual initiation and teenage pregnancy (Panday, *et al.*, 2009).

In other situations where the single mother is not financially stable, extended family members cushion the lower earnings of single mothers through extended family networks and the receipt of transfers (Posel, 2001). The more income earners and extra-household economic links and support systems there are in a single mother household the better its economic status (Posel, 2001). Extended family networks also provides more social control for adolescent sexual behaviour than when a single mother lives alone (Toroitich-Ruto, 1990).

2.7 Father involvement as a mediating factor

Theories discussed earlier showed that father involvement is positively correlated to children's outcomes. In South Africa about half of all men over the age of 15 were estimated to be fathers in 2006 (Posel and Devey, 2006). Unfortunately not all South African men seem to be interested to participate in the lives of their children and some may avoid it through abandonment, flight and denial (Morrell*, et al.*, 2003; Richter and Morrell, 2006). One of the many important responsibilities of being a father is to provide for one's children, many South Africans are neglecting that responsibility and some are unable to fulfil their paternal responsibilities (Richter, and Morrell, 2006). In 2002, nine out of ten people, most of them men, who were ordered by court to pay maintenance did not comply (Richter and Morrell, 2006). Poverty and unemployment are among the many reasons why black fathers do not take up their fatherhood roles(Morrell, 2006). Poverty is an important factor that undermines the role of fatherhood and the involvement of fathers (Morrell, 2006). Chronic unemployment has been one of the factors that prevents men from fulfilling their provider role and marrying (Hunter, 2006).

The effects of apartheid are to be blamed for the different positions black and white fathers find themselves. Apartheid mostly affected black families by separating the breadwinner, who is usually the father, from his children and forcing him to work in distant places in terms of migrant contracts that permitted only annual visits home (Richter and Morrell, 2006). Research has shown that although fathers may not live in the same house, they may have continuing contact and financial support with their children (Posel and Devey, 2006). The financial support from the non-resident father is more likely to continue when the couple is married than when they are not married. Findings from the Birth to Twenty cohort study indicate that father support is weak if a couple is not married, and it grows weaker over time (Richter, 2004).

Poverty and quality of parenting and family life are critical when discussing the importance of fathers (Morrell*, et al.*, 2003). The mere presence of the father is not itself an indicator of better adjusted or well cared for children (Madhavan*, et al.*, 2008; Morrell*, et al.*, 2003). Research indicates that the active father involvement in intimate child rearing and nurturing is important for children's development (Morrell, 2006). Fathers who have a warm, close

and nurturing relationships with their children can have a positive influence in their development (Morrell, 2006).

Many people in rural South Africa still see a father as a provider than a nurturer. In a focus group discussion participants were asked if a working father who provides all the necessities for his child but rarely sees it, is better than an unemployed father who spends time playing with and teaching his child (Russell, 2003a). About 17 out of 20 rural blacks agreed to the statement compared to two fifths of whites (Russell, 2003a). However, if fathers are working and are willing to fulfil the provider role they can lift children out of or prevent their fall into poverty (Morrell, 2006). Besides money, fathers are more likely to be associated with being a protector and there are indications that those children who live with their fathers are better protected than children who live in single woman-headed households (Richter, 2006).

The father's presence contributes to the emotional well-being of children (Johnson, 1996) and children in father-absent households are more likely to experience emotional disturbances and depression, although this can be confounded by socio-economic conditions and maternal stress (Richter, 2004). Father absence can affect socialisation and the physical maturation of children (Mendle*, et al.*, 2009). The paternal investment theory posits that the quality and the level of paternal involvement in parenting influences children's pubertal maturation and sexual behaviour (Mendle*, et al.*, 2009). On the other hand, the presence of a father can indirectly affect children's behaviour and development in many ways, which include the impact fathers have on mothers (Richter, 2006). The relationship between mother and child is influenced by mother-father relationship (Chandler, 1991). Women who live with partners are less stressed about child care issues (Richter, 2006). Mothers and fathers are important resources for children. Children benefit from the emotional and material investment from both parents. The absence of father creates a void in both mothers and children's lives (Chandler, 1991). International literature has shown that children raised in father absent households start sexual activities earlier than children raised in father-present households (Mendle*, et al.*, 2009). The absence of the father places daughters at a higher risk of early sexual activity and teenage pregnancy (Ellis, B*, et al.*, 2003).

Fathers may be involved in their children's lives even if they are not physically co-residing with their children, and the high levels of interaction between father, child and mother may indicate that the father is more responsibly and caring (Morrell, 2006) Non-resident father involvement is more beneficial for sons than daughters (Hawkins, 2007). This is partly because daughters show less risky behaviour and delinquency than boys (Thomas, Farrell and Barnes, 1996), and because informal controls of the family constrain the behaviour of daughters more than boys (Thomas*, et al.*, 1996). The behaviour of boys is problematic in a father-absent household as they tend to be overdependent on their overprotective mothers (Chandler, 1991). However, father presence also shows a strong relationship with high self-esteem for girls and low levels of sexual risk behaviour (Hunt and Hunter, 1977).

The consequences of living without a father in an extended family structure may have less impact than in nuclear families. In an extended family structures fathers are not the only men who can take up the fatherhood role in raising children. Morrell (2006) argues that children needs an adult male around them to care for them, love them and to provide for role models and that person may not be the biological father to accept and fulfil the role of father role towards one or more children. There are also situations where living with a father may not be in the best interest of a child, for example when the father is a drug user, engaged in crime etc. or maybe the child has been adopted. Other men who can be referred to as economic and social fathers can also exercise the fatherhood role. Economic fathers are those who contribute financially or otherwise to the upkeep of a child. Social fathers may include a range of men who live with and/ or care for children. Such men may be in relationship with the mother or a member of the extended family. According to the South African culture, it is important that all children be acknowledged by their fathers in order to benefit from connections to paternal extended families in the absence of the father. Children who are not recognised by their fathers can be left without connections to clan or extended family and will not inherit from the father, which may undermine the security of a child (Morrell, 2006).

2.8 Summary

Research has shown that sexual behaviour is seldom the result of single specified cause (Panday, *et al.*, 2009). It is a result of multiple factors and some of those factors are more direct (such as subjective norms and intention) and others are indirect (such as poverty and socio-economic status) mediated by more powerful direct determinants of behaviour (Panday, *et al.*, 2009). Each level of influence can affect sexual behaviour. Figure 2 has been adopted from Djamba's (1999) conceptual framework. It emphasises the role of family background (exposure to single motherhood), social control and economic hardship in shaping adolescent behaviour. The mediating factors are father involvement, maternal factors, education of the mother in particular, children's characteristics and extended family involvement.

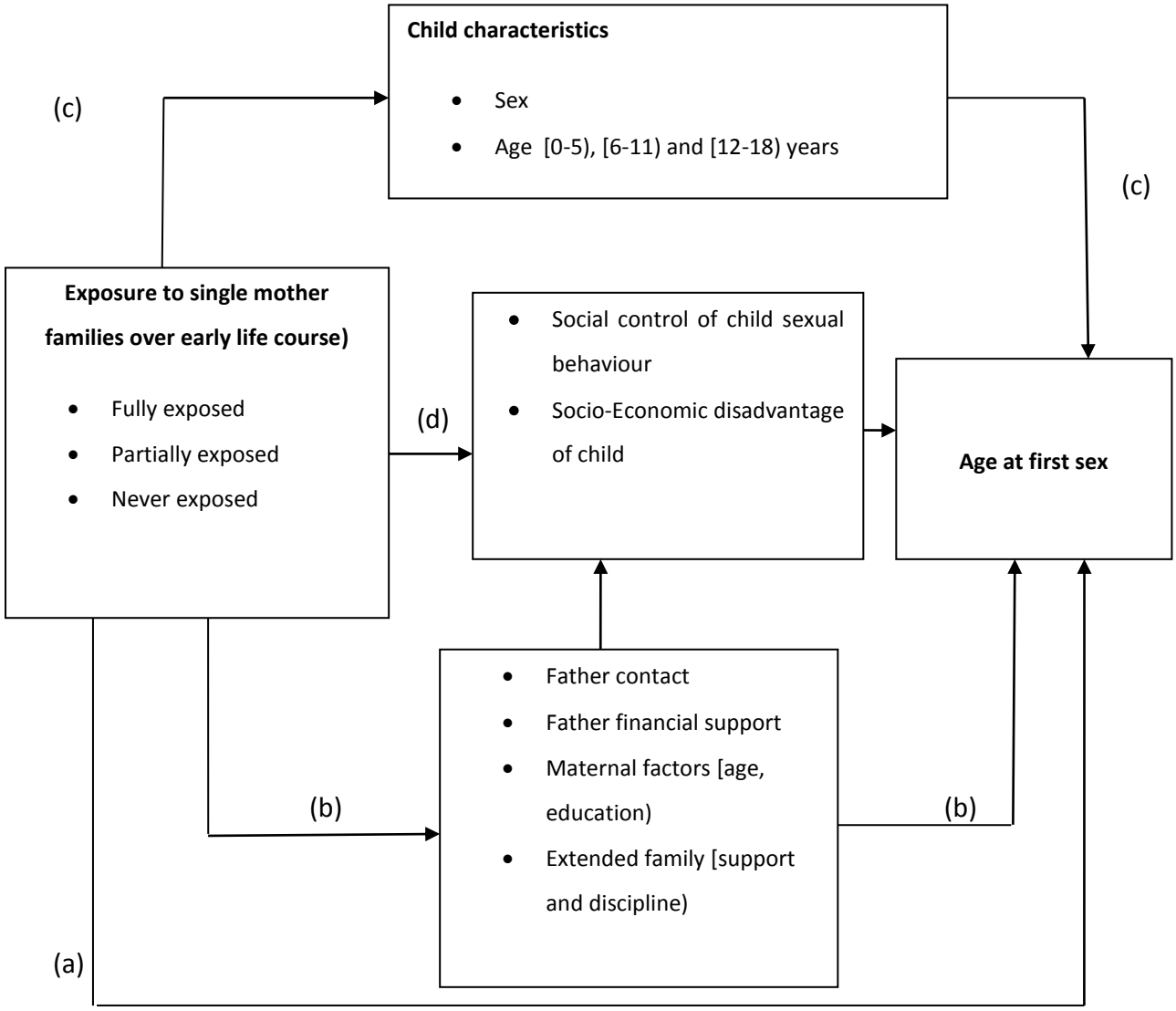


Figure 2: Conceptual framework for adolescent sexual behaviour

(a) Children's living arrangements and their exposure to single mother families are seen to have an impact on the age at which children initiate sex. However, there are mediating factors to that relationship. (d) Socio-economic disadvantage, lack of parental control and supervision has been cited in this study as determinants of early sexual activity. Children in single mother families are more likely to be poor, and single mothers are more likely to have permissive attitudes towards sex. Poverty can be a driver to engaging in early sexual activity and falling pregnant.

(b) Non-resident father contact and financial support can buffer the effects of exposure to the single mother family. Conversely, his non-involvement may make children living in a single mother family vulnerable to poverty and they may be poorly socialised. Single mothers who live with their children in extended families may be better off than those who stay alone. The presence of other adults in an extended household may increase social control which may delay sexual activity among adolescents. If there are other employed adults in an extended family, they may increase the household income and provide a cushion against poverty, more especially when single mothers are not working. Maternal characteristics, which are education, income, employment and age of the mother when she gave birth to the child, also play a significant role in influencing adolescents' sexual behaviour. Education is positively correlated to income. Low income and low education of the mother have been proven to have negative consequences for children (Bumpass and James, 1989; Jackson, 2003). On the other hand, mothers with higher education attainment are more likely to be able to provide their children, with a favourable environment for cognitive development, than mothers with less education (Jackson, 2003). The attainment of higher education increases the chances of well-paid employment. Single mothers with higher education are more likely to have more money than lower educated or uneducated mothers. However, not all social scientists agree with the effects of income on children. Some argue that parental characteristics (educational attainment, psychological well-being, employment and welfare status) are more important than income (Jackson, 2003). The age of the mother at the birth of the child and the mother's level of education have an impact on adolescents' earlier initiation of sexual intercourse. Mott *et al* (1996) found that there is a strong relationship between having sex at age 14 and children born to women younger than 20. Their research further shows that of the 90% of mothers who reported having had sexual intercourse before age 18, half had not attained a high school diploma.

(c) The age at which boys and girls are exposed to the single mother family also plays an important role in increasing the risk of early sexual initiation and pregnancy. Girls exposed early to single mother families seem to be more vulnerable to the risk of early sexual initiation than boys. Ellis *et al* (2003) argue that the timing of father absence contributed to the risk of early sexual activity and found that teenage pregnancy rates were seven to eight

times higher for girls with early father absence and two to three times higher for girls from late age father absence households.

This conceptual framework has emphasised social control and economic hardship as indirect factors that influence children exposed to single motherhood to initiate sex earlier. Father contact, financial support, and the extended family members' involvement are mediating factors. The age and gender of the child are confounding factors. The conceptual framework allows us to test the following hypotheses emerging from the two theoretical perspectives discussed earlier within the same analytical model.

2.9 Hypotheses

After reviewing the literature I identified research gaps for which there was insufficient information. Literature is silent on the duration and timing of exposure to single mother families, how much it has an impact on children's sexual behaviour and at what age that exposure should happen. As a result I have put forward several hypotheses to explain the association between the duration of exposure to single mothering, and the timing of exposure and age at first sex.

1. Children who have been fully exposed to single mother families are likely to engage in sexual intercourse earlier than those who have not been similarly exposed, and boys are more likely to initiate sex earlier than girls, even when we control for the age of the mother at the birth of the child.
   1.1. Father contact and support over the life course is positively associated with children's well-being. Father involvement mediates the negative effects that prompt children to engage in sexual activity.

2. The longer adolescents are exposed to single mother families, the earlier they are going to start engaging in sexual intercourse, when controlling for the age of mother at the birth of the child and the child's gender.

3. Children who have been exposed to single mother families at early and middle childhood [0-11 years] are more likely to initiate sex earlier than those who have been

exposed in late childhood (12-18 years) when we take into account the gender and the age at which the mother gave birth to the child.

3.1. Father involvement and extended family discipline and support at each developmental stage of a child is positively associated with children's sexual behaviour, even when gender and the age of the mother at birth of the child is kept constant.

Chapter 3

Methodology

This chapter on methodology includes a description of the study area (Soweto) and a brief history of sexual violence during the apartheid era in Soweto. We discuss data collection, structure of the retrospective questionnaire, analytical sample and sample selection bias. The methods of analysis used in the study are described (survival analysis, binary logistic regression, principal component method and two-way ANOVA) including each methods diagnostics and predictor and outcome variables.

3.1 Site description

Soweto is a township situated in the north-east of South Africa, south west of Johannesburg and its name is an abbreviation for **So**uth-**We**stern **To**wnships. Soweto is a collection of over 25 townships bordering Johannesburg's southern mining belt. The establishment of Soweto is linked directly to the discovery of gold in 1885 when many people migrated to Johannesburg to seek employment and more than half of the population was black (Findley, 2011; Joburg, 2011). Under the Group Areas Act enacted by the apartheid government, non-white workers were forced to live outside the cities in residential areas known as townships because cities were designated 'whites only' (Findley, 2011; Kaufman*, et al.*, 2001; Wojcicki, 2002). Soweto was specifically designated an African area and most black people lived in Soweto and commuted to white owned businesses or white homes as domestic workers, because under apartheid they were considered 'guest workers' (Findley, 2011; Kaufman*, et al.*, 2001; Wojcicki, 2002). Even in the post-apartheid period most blacks still live in Soweto and it is one of South Africa's largest urban townships (Joburg, 2011). Transport was limited to state-owned buses and trains during apartheid, and to fill the service gap between the need for urban transport and the capacity of the state system, private minibuses known as taxis or kombis provided transport in the townships and they continue to thrive even today. Post-apartheid kombis have been legalised and are still the most used form of transport system for many townships (Findley, 2011).

Under apartheid townships were regarded as 'bedroom communities' often situated far away from the 'white city' (Findley, 2011). With the arrival of more black labourers from

rural areas, Soweto grew out of shanty towns (informal settlements) because of the inadequate supply of housing (Joburg, 2011). Informal settlements sprawled on the periphery of townships to supplement scarce official housing (Findley, 2011). To understand this, Soweto occupies only 10% of the land of metropolitan Johannesburg but contains 40% of Johannesburg's predominantly black (Findley, 2011; Joburg, 2011).

Economically, Soweto is diverse, with shack settlements, modest middle income housing and mansions (Kaufman*, et al.*, 2001). Individual townships tend to have a mix of wealthier and poor residents but many townships in Soweto rank among the poorest in Johannesburg (Joburg, 2011). However, during the apartheid era there was lack of commercial development in black areas including Soweto which forced many township dwellers to shop in licensed white-owned centres or Indian-owned shops scattered around townships (Findley, 2011). To correct the apartheid legacy of inadequate housing, transportation and services in townships, the government has used infrastructure projects like the Reconstruction and Development Programme (RDP) (Findley, 2011). The RDP is aimed at improving government services and living conditions for the 17 million poorest citizens in South Africa and in 2009, 2.3 million homes had been built in the whole country(Findley, 2011). The government have also introduced the Bus Rapid Transit line (BRT) in Johannesburg and Soweto to provide fast transport and this was done in connection with the 2010 World Cup infrastructural investment (Findley, 2011). On the other hand, kombi drivers feared that the BRT system would drive them out of business. Other infrastructural developments include hybrid public transport and trade and shopping centres at the Baragwaneth taxi and bus facility, which provide Soweto with transport, trade and social interaction (Findley, 2011). This is opposite the Chris Baragwaneth Hospital (one of the largest hospitals in sub-Saharan Africa and the southern hemisphere), the facility which was completed in 2007 serves over 42 000 people daily, attracting more than 1000 informal traders (Findley, 2011).

The exclusion of Soweto from mainstream development during apartheid was not only limited to transport and housing, health services and educational facilities were also poor in Soweto (Findley, 2011). Schools were poorly maintained, which triggered the 1976 Soweto uprising when students protested against the official lowering of academic standards in

South African schools (Findley, 2011). Despite the low educational standards in Soweto, sex education and information about sexuality and contraception seems to have been widespread (Kaufman*, et al.*, 2001). In a focus group discussion in Soweto, boys and girls stated that because of the extensive knowledge provided by sex education ignorance of the physiology of sex was not recognised as a legitimate excuse for becoming pregnant, although sexual abuse or forced sex are common (Kaufman*, et al.*, 2001).

On the other hand, in the early 1980s there was little known about child sexual abuse in Soweto. Facilities available to deal with sexual abuse were located in white Johannesburg and were inaccessible to black residents of Soweto (Makhasibe and Brandt, 2005). Soweto had a history of violence against women. In the 1980s and 1990s people living in Soweto had problems with vigilante groups and gangs called Jackrollers who dominated township life and under apartheid there was little police control of the criminal violence taking place in black areas (Wojcicki, 2002). The Jackrollers were a gang of young men and boys who cruised around the streets raping women; some broke into homes to rape young girls (Wojcicki, 2002). These gang members originated as a specific Sowetan phenomenon that operated in Diepkloof (a relatively affluent area), they would also target public places, such as taverns, schools and streets (Wojcicki, 2002). Jackrollers saw rape as a game or sport and they were proud of what they did. However, jackrolling disappeared around 1994 during the time when South Africa became independent (Wojcicki, 2002). Human Rights Watch (1995) reported that 65% of rapes in Johannesburg occurred in Soweto in 1992 (Wojcicki, 2002). Furthermore, a study conducted by Dunkle *et al* (2004) in Soweto, where 1395 women attending antenatal clinics were interviewed, found that first sexual intercourse is usually forced and is associated with an increased risk of physical and/or sexual partner violence (Dunkle, Jewkes, Brown, Yoshihama, Gray, McIntyre and Harlow, 2004). In the same study 12.4% of women reported that they were forced to have sex at first intercourse, with 7.3% forced at the age of 15 or more years. The findings of the study confirm the need for increased attention to the prevention of gender-based violence to reduce risk of HIV infection and pregnancy among South African adolescents.

In Soweto and other urban African townships, extramarital sex and cohabitation was prevalent in response to the frustration caused by apartheid's laws, that restricted migrant

workers from bringing their families to stay with them near their place of work (Moeno, 2006). Many migrant labourers resorted to cohabitation with urban girls so as to qualify for urban residence, which made them legal heads of the rural family and also a domestic heads of a different urban family (Moeno, 2006). Some migrant labourers end up staying in the city for good, leaving the wife in rural area a de facto single mother (Moeno, 2006).

3.2 Description of the data

Birth to Twenty (Bt20) is a longitudinal study that enrolled 3 273 singleton children born in 1990 from women who were residents in the Johannesburg-Soweto area. It was the first cohort to be born into the democratic South Africa and the children were dubbed Mandela's children (Richter, Norris, Pettifor, Yach and Cameron, 2006). The Birth to Twenty cohort study began before 1990 when pregnant women were recruited in hospitals around Johannesburg-Soweto areas. These women were expected to deliver in a seven-week period from March 23 to May, 7, 1990 (Barbarin, 1999). During that time black Africans had started to disregard restrictive legislation that constrained them as to where to live and work, and as result there was very rapid unplanned urbanisation, which was going to have a profound effect on children's health and development (Richter *et al.*, 2006). The aim of the Bt20 research was to study the effects of urbanisation on the physical growth and psychological development (Richter, Yach, Cameron, Griesel and De Wet, 1995) of urban children born in the Soweto-Johannesburg area (Richter, Pandaya and Norris, 2009). Other studies on the Bt20 cohort explored life-style risk factors, diet and weight gain, parental monitoring and supervision, and risk behaviour (Richter, 2006).

The Bt20 study collected data at many different time-points across the 20 years: antenatal, delivery, 6 months, 1 year, 2 years, 3 years, 4 years, 5 years, 7 years, 9/10 years, 11/12years, 13 years, 14 years, 15 years, 16 years, 17 years and 18 years. The retrospective data used in this study was collected in 2009 when the children had turned 19 years of age. Bt20, like many longitudinal studies, suffers from attrition; permanent attrition due to the death of the child enrolled in the study and intermittent attrition attributed to the circular migration of families between rural and urban areas. Some of those returned to the urban area and are traced back into the study in later data collection waves. Permanent attrition due to

child mortality was estimated at 1.2 % (40) and less than 1% (fewer than 33) due to caregiver death for over 16 years. Most attrition happened in the first two years of the study and this was due to movement from the study area (Norris, Richter and Fleetwood, 2007; Richter, Norris and Wet, 2004). From the original sample about 20% (655) attrition of births were to mothers from rural areas who moved temporarily to urban areas to gain access to medical care not available in rural areas. The other 10% (327) attrition was attributable to the traditional practice of sending children to rural areas to be raised by the extended family (Barbarin, Oscar and Richter, 2001). As a result of permanent and temporary attrition, Bt20 has managed to follow more than 70% (2290) of these children and their families for 20 years.

3.3 Analytical sample

The initial enrolment consisted of 3273 participants that comprised whites 207 (6.3%), blacks 2568 (78.5%), coloured 383 (11.7%) and Asian 115 (3.5%). Because of temporal and permanent attrition in previous years, in year 19 when the retrospective data was collected on the Bt20 caregivers, 1990 participants were interviewed, that is 61% of the initial sample. The study had three questionnaires as shown in Figure 3. In the first questionnaire, the biological mother questionnaire was administered to 1540 biological mothers. In the second questionnaire the biological father questionnaire was administered to 90 biological fathers and in the third questionnaire, the caregiver questionnaire was given out to 360 caregivers of the children in the cohort in case their biological parents were not traceable or were deceased.

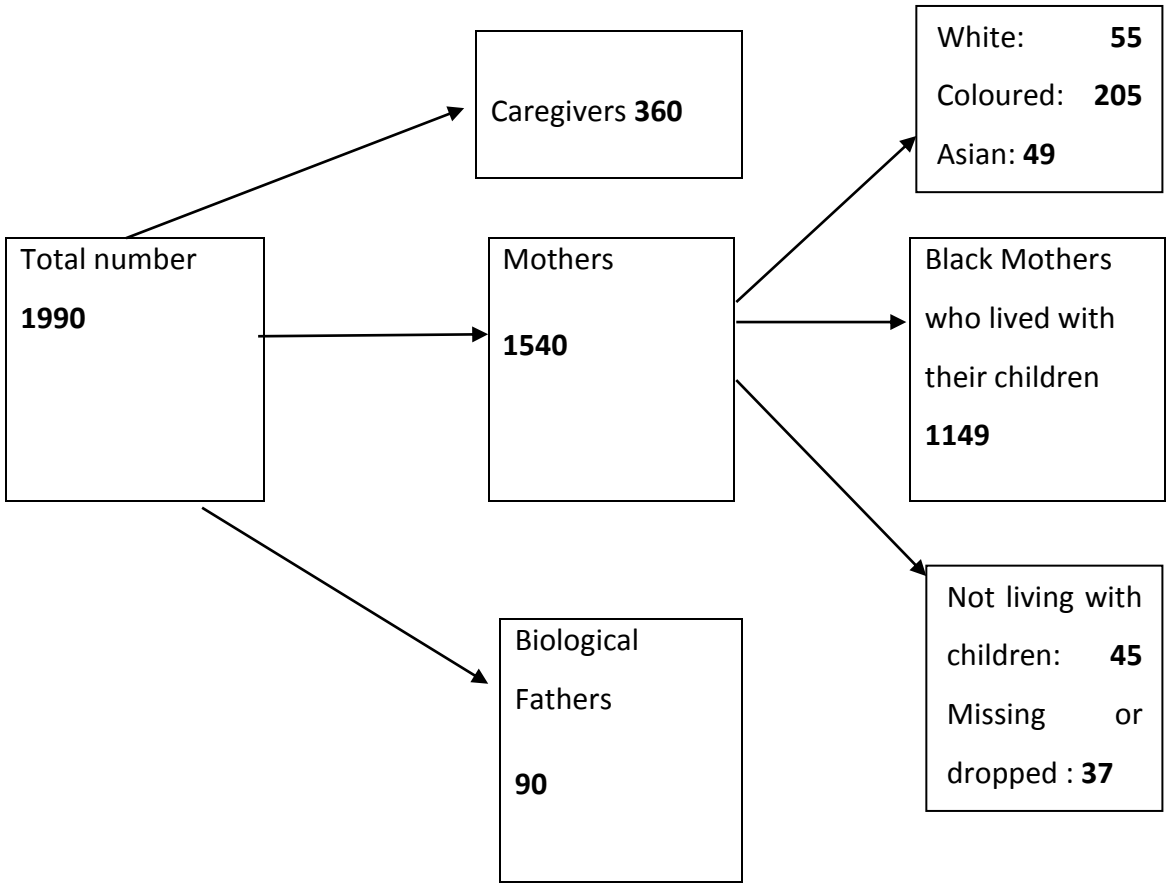


Figure 3: Participants interviewed

The first preference was given to interviewing the biological parents of children. From this study's definition of a single mother adopted from Heuveline *et al* (2003), children who were permanently not living with their biological mothers (45) were dropped from the sample. These included children who were staying with caregivers (360), biological fathers (90) and children from other races (303). This selection criterion reduced our sample to 1149 of all black mothers who were living with their children out of 1540 who were seen at the time of the interviews. Since the study constituted of almost 80 percent of black mothers, only black mothers and their children who satisfied the criterion for a single mother were retained for this research purposes because of their larger proportion and for comparison.

Data on sexual behaviour came from prospective data which was first collected in year 14 and annually thereafter, where children from the cohort had to answer questions to determine the age at which they started having sex. Before children could answer any

questions consent had to be obtained from their parents as they were under the age of 16 (legal minors) and couldn't consent themselves. Asking children questions about their sexual behaviour is considered sensitive. Bt20 used self–administered questionnaires to collect data on the sexual behaviour of children. Self-administered questionnaires offer respondents a high degree of privacy and anonymity, which should lead to more self-disclosure than interviews. Research has shown that self-administered questionnaires produce more valid reports of sensitive behaviour and less socially desirable answers in general (DeLeeuw, Hox, Kef and Hattum, 1997). The proportion of respondents who had had sex before age 18 years was more than half (52.3%), 599 of the 1145 from the sample.

3.4 Selection bias

In an attempt to select children who were living with their biological mothers almost 25% of the children were left out of the study sample. To make sure that there was no selection bias, I had to compare the mean, mode, range, and variance of the ages at first sex for the selected group and those excluded from the study.

Table 3: A comparison of ages at first sex for children living with mother, father, caregiver and children not living with mother

Measures of Dispersion	Father	Mother	Caregiver	Not staying with mother
Mean	15.07	14.9	14.87	15.3
Median	15	15	15	15
Mode	15	15	16	15
Variance	3.34	3.73	4.1	0.33
Range	9	10	10	1
Minimum	9	8	8	15
Maximum	18	18	18	16
Engaged in sex	42 (46.7%)	599 (52.1%)	183 (50.8%)	3 (6.6%)
Not engaged in sex	29 (32.2%)	546 (47.5%)	132(36.7%)	35 (77.8%)
Missing	19 (21.1%)	4 (0.4%)	45 (12.5%)	7 (15.6%)
Total	90 (100%)	1149 (100%)	360 (100%)	45(100%)

From the table you can observe that the age distribution for the four groups is almost the same as the median, mean and mode are similar. This distribution can be further illustrated by the three graphs in Figure 4.

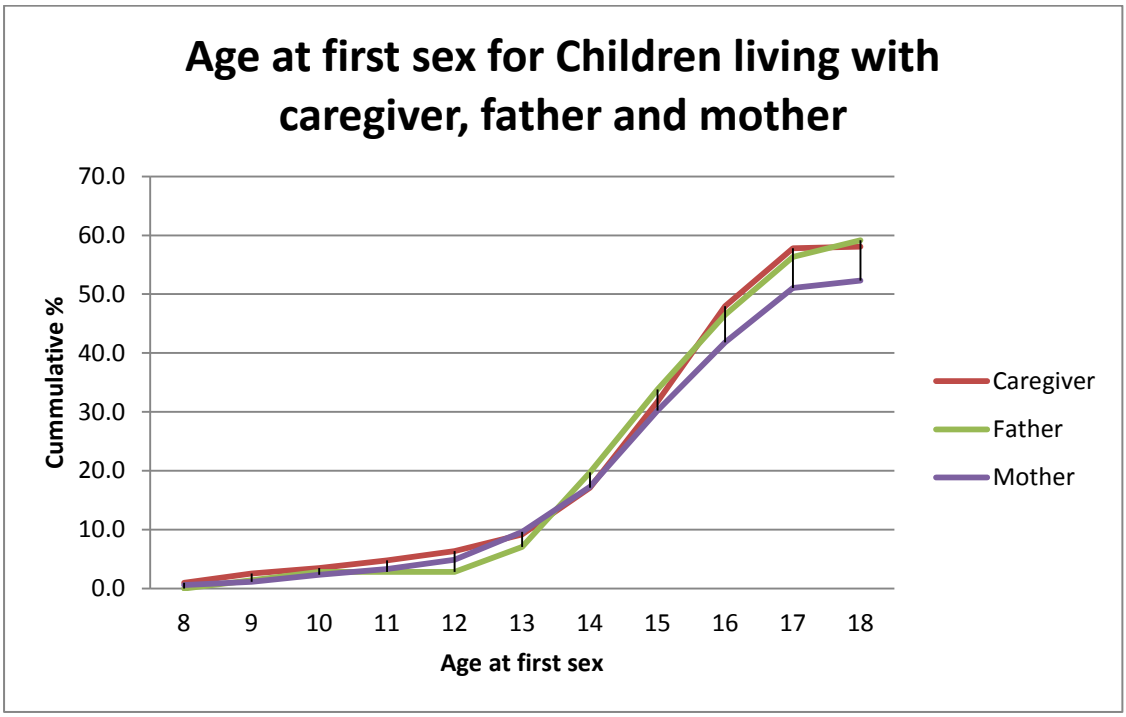


Figure 4: Age at first sex for children living with caregiver, father and mother

Since these graphs are very similar, it would suggest that the age distribution at first sex of children who were selected for this study is not different from those who were excluded. However one cannot rule out that the study may suffer selection bias from those children who were lost to follow-up. Some of the adolescents who had started having sex were already staying with their partners and it was difficult to trace and interview them as many were not attending school and in some cases the partner did not approve of the interview. The sample also excludes those who engaged in sex after the data was collected.

3.5 Data collection

Interviews were conducted by trained Bt20 research assistants. The interviewers completed two weeks' training on the questionnaires and part of the training included supervised practice in the administration of interview. Each interviewer was observed administering the questionnaire, and corrective feedback was provided. No one was permitted to conduct actual interviews before she or he had met the required standard of competence in presenting questions. After the training, a pilot study was conducted and necessary corrections were made on the questionnaires, and retraining was administered if necessary.

3.5.1 Procedures

The most recent addresses of participating families were generated from the main registrar of the Bt20 study. Families were called or visited and an interview appointment was set up. Interviewers visited mothers' homes and the questions were read aloud to them, to which they responded. Interviewers wrote down the participant's responses on questionnaires with notes. Any inconsistencies were queried, and mothers were asked to help the interviewer clarify the discrepancy more especially when it involved dates since this was retrospective information. Interviews took almost 60 minutes. In some cases parents' work schedules did not permit them to be interviewed at home and alternatively, mothers were invited to come to the interview site (Chris Hani Baragwaneth Hospital), the main hospital serving Soweto and where Bt20 offices are situated.

3.5.2 Retrospective questionnaire

The retrospective data was collected in Year 19. The questionnaire was mainly designed to collect data that can allow us to understand changes in marital status and father and extended family involvement in the children's lives. It relied on recalling information about the mothers' marital history. The retrospective study collected data on mothers' marital history and on biological father's contact and financial support and extended family involvement. The questions on mothers' marital status had previously been asked at antenatal, year 1, year 2, year 4, year 5/6, year 7/8, year 9/10, year 13, year 15 and year 19 (See Retrospective Questionnaire in the appendix, pg. 4 and 15). They were never asked in all data collection waves and because of temporary attrition some participants are not

found in all data collection waves. As the retrospective data was collected at one point in time it was used to fill in the gaps and give more and complete information on the history of mother's marital status, father contact and financial support, and also extended family members' involvement in the financial support and discipline of the child.

From the mother's marital status we were able to establish children's living arrangements and exposure to single mother families. The retrospective study allowed us to calculate the length of exposure in years and time of exposure by the child's developmental stages as opposed to using cross-sectional data.

3.6 Predictor and outcome variables

To examine the patterns of exposure to single mother families, we first created predictor and outcome variables using the questions from the retrospective questionnaire, which allowed us to come up with the following variables to be used in the analysis.

3.6.1 Predictor variables

3.6.1.1 Exposure to single mother family variables

Using the child as a reference point it is possible to establish the child's living arrangement and their exposure to single mother families. The retrospective questionnaire asks the following questions, which could be used to derive a measure of children's living arrangements using the mother's marital status:

Question: which of these categories best describe your marital status? And the following options were given (Questions 2,6,23, 24, and 26 from Questionnaire in the appendix).

1. Single, no relationship
2. Not married, not cohabiting, but have casual partners
3. Not married but cohabiting
4. Married—partner present
5. Married—partner absent
6. Separated (if married)/Divorced
7. Widowed

As defined for this study a single mother does not live with a husband or partner. Mothers who were [1] single and in no relationship and those who were [2] not married, not cohabiting but had casual partners, those [6] separated, divorced and [7] widowed were classified as single mothers at that time. Children living with their mothers at these stages of their mother's marital status were considered to be exposed to single mother families. Children living with their mothers when they were [3] not married but cohabiting or [4] and [5] married with partner present or absent were described as living with two parents. Mothers who were not living with their children were not considered as single mothers. Mothers had to live with their children to fit the criterion of being a single mother. To establish whether the mother has been living with the child the following questions were asked: (Question 27, 28 and 29 from the questionnaire in the appendix).

- Is the child currently staying with you in the same household? (Yes/No).
- When is the last night the child stayed in the household?
    1. Yesterday
    2. A few days ago
    3. A week ago
    4. A month ago
    5. More than a month ago
    6. Not applicable

- Has the child not lived with you at any point during these ages, if so with whom and for how long?
    - 0-2 years
    - 3-5 years
    - 6-11 years
    - 12-18 years

When we ran simple frequencies of the data we found that a smaller proportion of mothers had lived with their children for less than two years. The two years became a cut-off for the study. If the mother had not lived with her child for all the time in all developmental stages or for more than two years without a break she was dropped from the list of single mothers even if she was single. Those who were included are those who were staying with their

dependent children all the time and those who have their children temporarily absent for a short time (less than two years).

During the interviews the mother was asked retrospectively her marital status in the past 18 years and this information was populated with prospective data collected in different data collection waves. Using their responses the number of years each child spent in different family structures was calculated as follows;

- Numbers of years an adolescent has spent in single mother families (full exposure).
- Number of years an adolescent has spent in two parent families (never exposed).
- Number of years an adolescent has spent in two parent and single parent families (partially exposed)

These years are used to create a three-category indicator of exposure status: never exposed, fully exposed and partially exposed to single motherhood. We make distinctions about the timing of these events by specifying the childhood stages - ages 0-5, 6-11 and 12-18, when the events occurred. Developmental stages are important because of age specific needs and psycho-social and physiological changes that all children go through, therefore living arrangements are likely to have different impacts at different stages.

3.6.2 Mediating Variables

Extended family involvement and father involvement variables are intervening variables that seek to clarify the nature of relationship between exposure to single mother family and age at first sex.

3.6.2.1 Extended family involvement

In the South African context some single mothers live with other extended family members either as a separate household or living with others in the same household e.g. grandmothers etc. It is also common to find that children in single mother families may have social and economic fathers in their lives (Richter and Morrell, 2006). To establish whether the mother received some assistance from other family members, the retrospective questionnaire asked the following questions (Questions 39, 43 and 44: see questionnaire in the appendix):

1) Who has been the major financial contributor to rearing the child since birth by developmental stages?
2) Who has been responsible for making sure that the child is disciplined (discipline means setting boundaries, reprimanding or communicating with the child rather than physical discipline) and at what developmental stage?

The following options were provided.

a) Mother only
b) Father only
c) Mother and father/partner
d) Father/partner, mother and other family members
e) Mother and other family members
f) Father and other family members
g) Other family members

These questions were aimed at finding out if extended family members were available and contributing to upkeep of the child. Because of sample sizes the extended family members' categories were recoded and collapsed to:

1. Mother only
2. Father only
3. Mother and father/partner
4. Father/partner or mother and other family members
5. Other family members

During the analysis mother only was used as a reference category when comparing with other categories.

3.6.2.2 Biological father's contact and financial support

The retrospective questionnaire also explored the non-resident biological father's involvement in rearing the child. Some fathers may not be part of the same household as their children but may have extensive and continuing contact and financial support of their children, accomplishing many of the typical fatherhood roles ascribed to men. However, as

mentioned in the literature, the presence of a partner in a household excludes the mother from being a single mother.

In describing father involvement we include two distinctive aspects of fathering; contact and financial contribution. By contact we established whether non-resident fathers visit or communicate with their children. The question of father support and father contact is also asked in the same question where the mother fills in her marital status history. When the mother reported her marital status she had to answer questions to determine whether the father was regularly in contact with or had been financially supporting the child since the child was born until the age of 18 years. In cases where the contact and support from the father was not regular, this is regarded as no contact or financial support. From this information we were able to calculate the proportion of children who were in contact and/or financially supported by their fathers in early childhood, middle childhood and late childhood. Children who were born into single mother families without father presence until age 5 and subsequent father absence during ages 6 through 11 are classified as early father absence and late father absence from ages 12 through 18. The presence of father contact and support by developmental stages were coded 1 and father absence and lack of support was code 0 for all developmental stages.

3.6.3 Socio-economic status

3.6.3.1 Mother's education

The mother's educational attainment at the birth of a child is used as a proxy measure for economic status in this study. Parents' levels of education are associated with distinctive patterns of values, access to information and lifestyles (Barbarin, Oscar and Richter, 2001).

The mother's educational attainment is of primary importance because mothers, unlike fathers, are more likely to be involved with the socialisation of the child as they spend more time with children (Krishnan, 2010). Mother's education is categorical and dummy variables were created.

1) Primary
2) Secondary
3) Matric
4) Post-matric training

3.6.3.2 Mother's age at birth of child

We included age of mother when she gave birth to the child. Age is a continuous variable and since we were interested in those women who gave birth before age 20 we created a dichotomous variable, those who gave birth before age 20 and coded it 1 and those who were older than 20 years were coded 0.

3.6.3.3 Household wealth index

The household wealth index was only measured indirectly through possessions in the home and was constructed from ownership of home, possessions etc. I applied Principal Component's Analysis (PCA) to create an asset index based on the data from ownership of TVs, cars, washing machines, refrigerators, and telephone, and access to services e.g. refuse disposal and water access, and information on toilet facilities. Using the PCA I first recoded the household variables into dummy variables distinguishing between households that own the particular asset or which have access to services. All variables take on a value of zero or one and there were 28 variables in total. The PCA reduces the number of variables without losing too much information in the process and creates a fewer number of variables which explain most of the variation in the original variables (Achia, Wangombe and Khadioli, 2010). For creating the household wealth index three variables were extracted, which accounted for total variance of 39.3% (Figure 5, Scree plot, chapter 4).

Using the PCA I created a three level socio-economic status variable indicating household wealth:

a) Low
b) Middle
c) High

3.6.4 Children's characteristics

3.6.4.1 Gender of child (confounder)

We included gender as a dichotomous variable coded 1 for males and 0 for females. Gender is regarded as a confounder.

3.6.4.2 Age at first sexual encounter

Age at which the child started having sex (continuous variable).

3.6.5 Dependent variables

3.6.5.1 Variable age at first sex

Age at first sex is the only dependent variable in our study. Beginning at age 14 years participants were asked whether or not they had ever had sexual intercourse (vaginal or anal penetration) with someone of other sex. Those who reported 'Yes' were asked how old they were the first time they had sex. Participants were asked these questions once, but because of different waves of data collection it may happen that the same participant may report that s/he had not engaged in sexual activity and in another interview report that s/he had had sexual intercourse. These discrepancies were minimal and were managed by cleaning the data. The first interview response was considered and those participants who reported intercourse before age 8 years were excluded from the sample.

Age at first sex was treated as a continuous variable which indicated ages at first sex for the first analysis using the Kaplan-Meir method, which was used as a time variable (the time from birth until the child engaged in sex). For the second analysis, age at first sex was categorised into two dichotomous variables. Those who had engaged in sex by age 18 were coded 1, and 0 for those who had not engaged in sex. The age 15 years for cut-off has been used to demarcate the early onset of sexual activity because it is the median age of sexual initiation for cohort members. This age is important because most of these children are still at school and distractions related to pregnancy and HIV and other STI infections may affect their schooling. Moreover, the age of consent in South Africa is 16, the legislation stipulates that children between age 12 and age 16 cannot consent to sexual intercourse. Children

under 12 years are assumed to be incapable to consent to sex and a sexual act with a child under age constitutes rape or sexual assault and it punishable by law (AVERT, 2014). Girls and boys who engaged in sexual activity by 15 were coded 1 and those who engaged in sex after they had turned 15 were coded 0.

This is the list of outcome variables:

1. Ever had sex by 18 years (dichotomous)
2. Early sexual initiation (ever had sex by age 15) (dichotomous)
3. Age at first sex (continuous)

3.7 Methods of analysis

For the analysis four methods described here were used: chi-square, Kaplan-Meir, Cox and logistic regression and two–way ANOVA. For all categorical variables dummy variables were created and the first category was left as a 'reference' category to be compared against the other categories.

3.7.1 Bivariate analysis

Since there were 36 predictor variables created not all of the variables had a significant association with the outcome variable. Some of the variables were dropped from the analysis but some variables of interest were kept even if they were not significantly associated with the outcome variable, for example, exposure to single mother variables. To test for association a Chi Square was run between each independent variable and dependent variable and statistical significant associations were retained. The next step was to check whether there is no strong collinearity between independent variables. A correlation matrix on all independent variables was run. Independent variables with a significant relationship with the other independent variables, for example $r > 0.8$, were regarded as highly correlated with each other and most of these variables were not put in the same model. For example, father contact (0-5 years), father contact (6-11 years) and father contact (12-18 years) were found to be highly correlated and different models were fitted model to avoid multicollinearity.

3.7.2 Multicollinearity

According to Graham (2003) correlations among independent variables can adversely affect the regression estimates. Problems may be evident when R^2 is large but none of the individual beta weights are statistically significant, or when the model produces bizarre beta weights estimates e.g. in a wrong direction (Graham, 2003) and in a worst case scenario the analysis will not work? Removal or addition of a correlated predictor variable can improve the model and result in enormous changes (Grewal, Cote and Bammgartner, 2004).

To deal with the problem of multicollinearity in this study we first measured VIF (Variance Inflation Factor) for all predictor variables using linear regression, which indicates the degree to which the standard errors are inflated due to levels of collinearity. VIF values of 10 or greater are often cited as indicative of problematic collinearity. To address the issue of multicollinearity, 1) we first checked to see if one of the highly correlated predictor variables is a duplicate; 2) redundant variables and duplicates were removed; 3) father contact and support were aggregated because both represented father involvement. Lastly, after considering the above solutions, highly correlated predictor variables were not fitted in the same model. Partial exposure is highly correlated to never exposed and fully exposed, partly because the partial exposure variable was created from full exposure and never exposed variables. As a result the three exposure variables are modelled separately.

3.7.3 Two-way ANOVA

Further analysis was done for the continuous outcome variable age at first sex using two-way ANOVA to see if there is a variation within significant predictor variables. Two-way ANOVA analyses one interval dependent in terms of the categories (groups) formed by two independents, one of which may be conceived as a control variable. The two way ANOVA will test if the mean age at first sex differs by each independent variable and tests if there are interaction variables. Mean differences of ages at first sex between males and females who have been involved in sex were tested using the F statistics. Further comparisons of mean age at first intercourse between males and females using the t-test statistic were carried out.

3.7.4 Diagnostics for age at first sex variable

Age at first sex is treated as a continuous variable but before using the two-way analysis of variance the following assumptions have to be satisfied.

- The variable has to be normally distributed
- The variances of different samples are homogenous
- Variances and means of different samples are not correlated i.e. are independent

To ensure that the data fits the assumptions of the analysis I conducted preliminary data analyses to test for normality and homogeneity of variance on the dependent variable age at first sex.

3.7.5 Test of normality

Histogram, measures of central tendency, distribution and dispersion; mode, median, Kurtosis, skewness, variance and mean were calculated (Table 4). Lavene tests were also conducted to test for equal variances.

Table 4 Age at first sex and measures of central tendency, distribution and dispersion

Age at first Sex	Number of Children	Percent	Measures		Std Errors
8	7	1.2	Mean	14.9	0.079
9	6	1.0	Median	15.00	
10	14	2.3	Mode	15.00	
11	11	1.8	Std Deviation	1.930	
12	18	3.0	Variance	3.725	
13	54	9.0	Skewness	-1.192	0.100
14	88	14.7	Kurtosis	1.765	1.765
15	148	24.7			
16	133	22.2			
17	106	17.7			
18	14	2.3			
Total	599	100			

According to table 4 the mean, mode and median are theoretically similar as further shown in the histogram (figure 5), which suggests that the age at first sex is normally distributed.

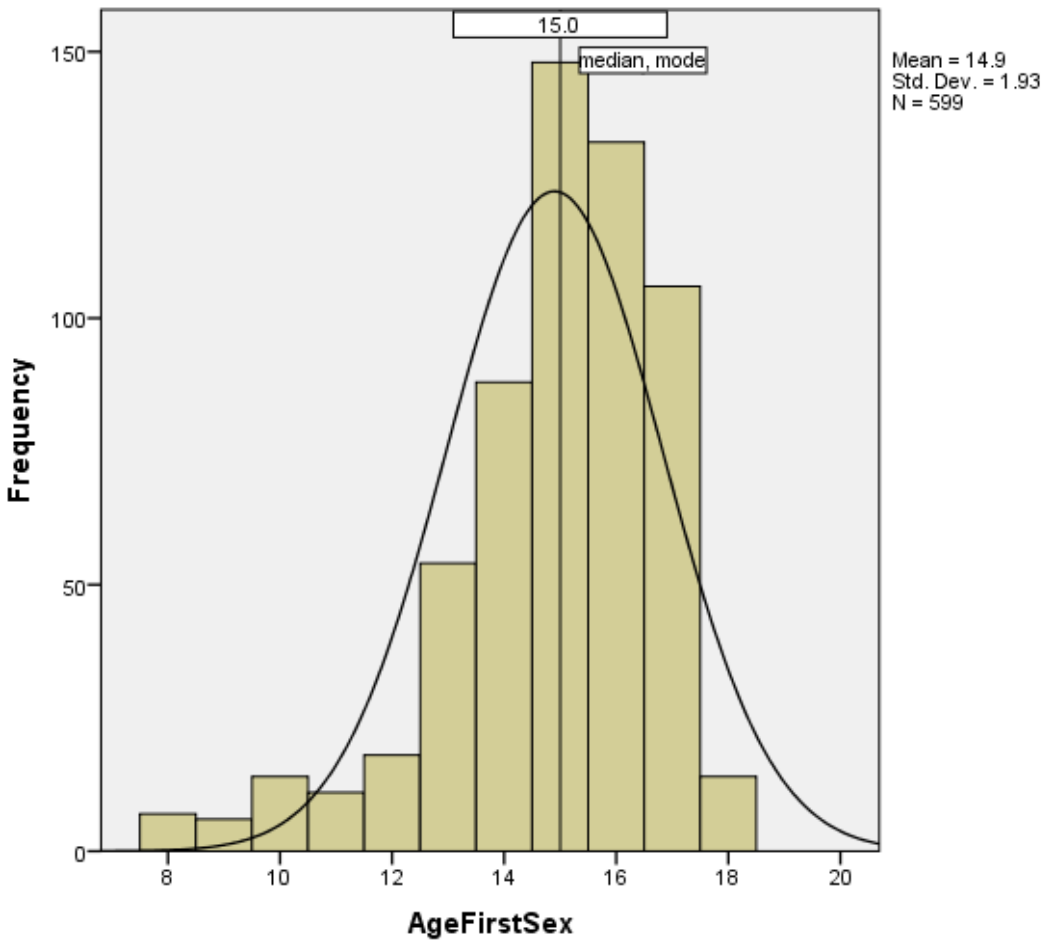


Figure 5: Distribution of age at first sex

On the other hand, the normality test (Kolmogorov-Smirnov) shows that age at first sex is not normally distributed although the mode and median and mean have been found to be equal. The significance of test statistics is indicative of rejecting the null hypothesis (Table 5).

Table 5: Tests of normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	**df**	**sig**	**Statistic**	**df**	**sig**
age at first sex	**0.191**	**599**	**0.000**	**0.894**	**599**	**0.000**

Looking at the Q-Q plot in Figure 6, which is considered the best check for normality, normality seems reasonable.

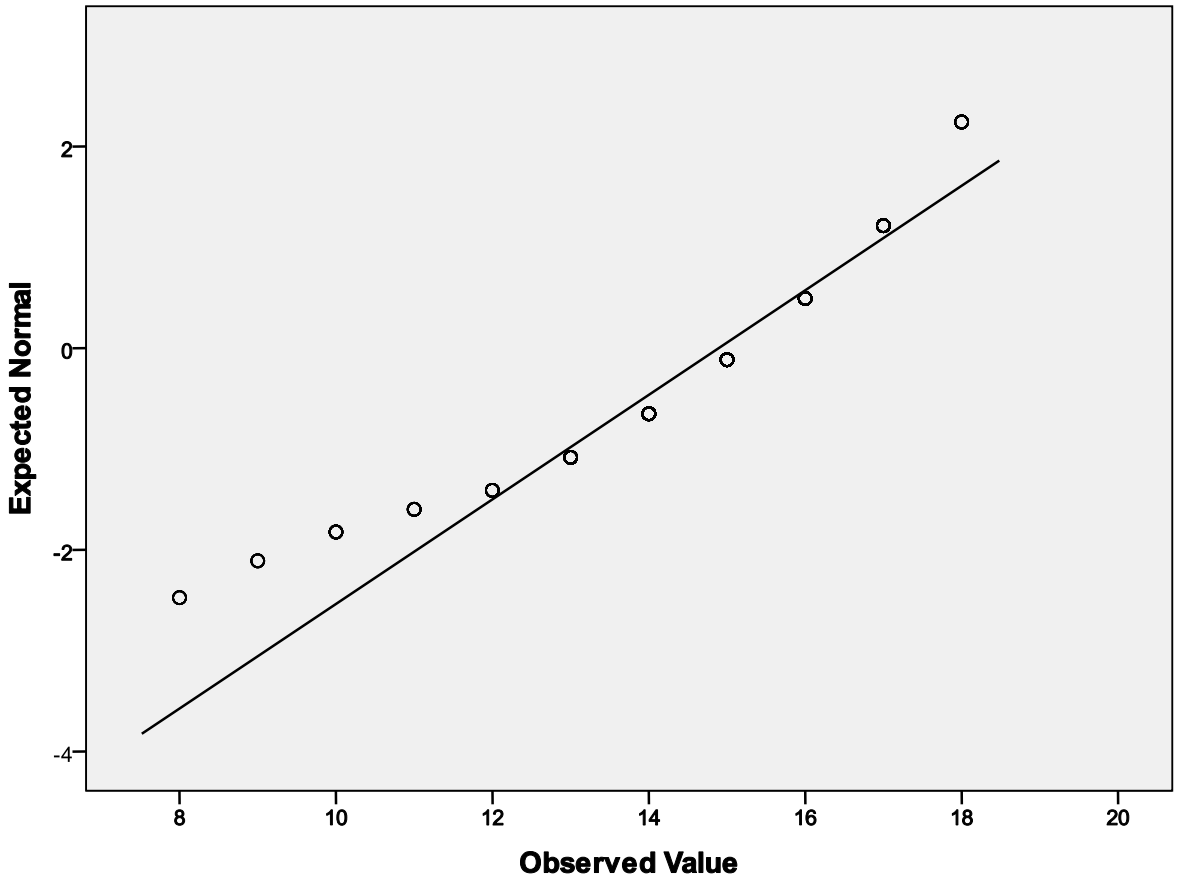


Figure 6: Normal Q-Q plot of age at first sex

3.7.6 Tests of homogeneity of variance

When assessing the homogeneity of variance between the two groups using the Lavene test for equality of error variances, I found that there was no homogeneity of variance between the groups. Table 6 shows the results performed by the Levene test. Since the test statistic is less than 0.01 we reject the null hypothesis and claim that there is evidence the populations variances are not equal.

Table 6: Levene's test of equality of error variances

Dependent variable: age at first sex			
F	**df1**	**df2**	**sig**
40.685	**1**	**597**	**0.000**

Two-way ANOVA tests whether the groups formed by the categories of the independent variables were similar centred. This method of analysis was found to be less sensitive and robust to moderate violations of the assumption of homogeneity of variances across the groups (Chiarotti, 2004; Lindman, 1974). The two-way ANOVA is preferable when the study was designed to measure two different factors, at the same time. Since the parametric tests assume non-equal variance there is also another non- parametric test (Kruskal-Wallis) that can be used, which has an advantage because there is no underlying assumption of normality. However, using the Kruskal-Wallis test will only calculate P-values for each parameter effect but no interaction p-value. Despite the fact that the data violates some assumptions of the two-way ANOVA it can be used setting the p-value at 0.01 to avoid committing the type one error.

The results for two-way ANOVA are displayed in Chapter 4 where we further examine the relationship between predictor variables and the continuous variable age at first sex. We test for effects of timing of exposure at each developmental stage for early childhood (ages 0-5), middle childhood (ages 6-11) and late childhood (ages 11-18). Then test for effect modification (interaction) of father contact and support, and extended family involvement. Further analyses were conducted using the Kaplan-Meir method.

3.7.7 Kaplan-Meir method

The Kaplan-Meir method was used because we were estimating the time to event (age at first sex) in the presence of censored cases (children who have not started sex). In our sample we have children who had not engaged in sex at the time of the study and that can be referred to as right censored. Left censoring can happen when event of interest occurs before the study, which did not apply in our study because the study began when the children were born. The Kaplan-Meir can be used to estimate curves from observed survival times without the assumption of an underlying probability distribution, and test the Null hypothesis that there is no difference between the population survival curves [i.e. probability that children will start engaging in sexual activity is the same for each group (fully, partially and never exposed to single mother family).

Assumptions

- Probabilities for the event of interest should depend only on time after the initial event without the effects of covariates.
- Censored and uncensored cases behave the same.

Variables

Time Variable: Age at first sex or duration from birth to time (years) the child starts having sex (continuous)

Status Variable: Ever had sex in 18 years (1= Yes, 0= No)

Factor variable: Status of exposure (categorical).

Procedure

We have the time, status and factor variables and we want to compare the effect of exposure status on age at first sex if it is the same for all factor variables (exposure statuses).

The results are shown in Chapter 6.

3.7.8 Cox regression

The Cox regression models the time to a specified event based upon the values of given covariates similar to logistic regression but Cox regression assesses the relationship between survival time and covariates. It also deals with durations; the number of time units or individual spends at a given state (amount of time children are in single mother families).

Variables

Status Variable: ever had sex (1= yes, 0=No)

Time Variable: Duration of time to event of interest [age at first sex (continuous)].

Covariates: Gender, age of mother at birth of child, education of mother, father contact and support, extended family support and wealth index.

We use the Cox regression to determine which attributes are associated with late or early sexual activity.

We also use the binary logistic regression.

3.7.9 Binary logistic regression

Since my data has two dichotomous outcome variables (ever had sex by 18 years (Yes/No) and earlier sexual activity (Yes/No) and a mix of categorical and continuous independent variables which are not normally distributed, the logistic regression was the most appropriate method of analysis. In order to explore further which predictor's variables are associated with children's initiation of sex by age 18 years and earlier sexual activity by 15 years, I performed two logistic regression models: one with the dependent variable ever engaged in sex (Yes/No) and the other model with independent variable if sex happened before age 15 years (Yes/No). In both models the some independent variables were significant. The results are shown in Chapter 6 and 7, which illustrates the association between independent variables and the binary measure of initiation of sexual activity by age 18 years and earlier sexual initiation.

The results for these analyses are shown in Chapter 4, 5, 6 and 7. Chapter 4 begins by showing descriptive demographic characteristics of mothers and their children, which include gender of child, age of mother at birth of child, mother's educational attainment and the sexual behaviour of children. This is followed by ANOVA (Analysis of Variance) of each predictor variable with outcome variable.

Chapter 4

Results: Descriptive and bivariate analysis of selected mother and children's variables

The purpose of this chapter is to give a descriptive and bivariate analysis of the study sample. For the bivariate analysis we test for association between predictor variables and the two dichotomous outcome variables; ever had sex by age 18, and had sex at an earlier age (15 years or less). The results are presented in six sections: 1) demographic characteristics of mothers and their children in the Bt20 cohort at birth of the child, 2) Percentages of children who have started having sex is presented showing the cumulative proportion by gender and age, 3) cross tabulations of gender and selected predictor variables using the Pearson's χ^2 – statistics on outcome variables ever had sex by age 18, and earlier sexual initiation (ever had sex by age 15), 4) father support and contact by developmental stages is cross-tabulated against the two outcome variables, 5) extended family support and discipline is cross- tabulated against the two outcome variables, and 6) the calculation of the household wealth index using the principal component method (PCA), which is cross tabulated with the outcome variables.

4.1 Selected Demographic characteristics of mothers and children

Table 7 shows selected characteristics of mothers and children at the birth of the child. The number of both female (586) and male (559) children was almost equal. From the table, it is evident that of the almost 40% of children born into single mother families, 38.8% were males and 41.6% were females. The other 60% were born into two parent families. There were slightly more males (61.2%) born to two parent families than females (58.4%).

Table 7: Children's living arrangements at birth by sex and demographic characteristics of the mother

	Children's living arrangements at birth by gender		
Children	**Single mother families**	**Two parent families**	**Total (100 %)e**
Males	217(38.8)	342 (61.2)	559
Females	244(41.6)	342(58.4)	586
Total	461(40.3)	684(59.7)	1145
Mothers' education at birth of child			
Primary	75(52.8)	67(47.2)	142
Secondary	239(52.2)	219(47.8)	458
Matric	188(51.6)	176(48.4)	364
Post matric	53(55.2)	43(44.8)	96
Age of mother at birth of child			
Age	**Single mother family**	**Two parent family**	**Total 100%**
>20 years	281(31.1)	623(68.9)	904
<20 years	180 (74.7)	61(25.3)	241
Total	684(59.7)	461(40.3)	1145

The educational attainment of mothers who are married is not strikingly different from those who are single at birth of the child (Table 7). Educational attainment is important because it is correlated to employment r (1139) =0.313, p=0.000, p<0.01. Generally, higher educational levels are associated with higher chances of getting well paid employment. In this analysis the mother's education and the age at which the mother gave birth to the child have been used as proxy measures for socio-economic status as they both impact on the child's sexual behaviour.

4.2 Gender and sexual behaviour

Gender has been seen as one of the important predictor variable to the sexual behaviour of children. This analysis is based on the sample of 599 children from the cohort who had already started having sexual intercourse and it focuses on the differences between males and females. We provide a descriptive analysis of sexual activity between males and females and then present results for the interaction between gender and selected predator variables. Table 8 shows that mean age at first sex is higher for females (15.81 years) than

for males (14.22 years), which means that females start sexual activity later than males. The sample had in total 52.3% of the adolescent in the cohort who had engaged in sex before age 18, that is 256 females and 343 males (Table 8). The youngest age males became sexually active is 8 years, and 10 years for females.

Table 8: Descriptive statistics of age at first sex by gender

Statistics	**Female**	**Male**	**Total**
Mean	15.81	14.22	14.9
Median	16	15	15
Min	10	8	8
Max	18	18	18
Std deviation	1.247	2.059	1.92
N	256	343	599

The median ages are 16 years for females and 15 years for males. This shows that on average males initiate sex earlier than females. This cohort results do not deviate much from the 2003 RHRU National Survey data which indicates that the median age at first sex is 16 years for males and 17 years for females among 15-24 years (Panday, Saadhna, Makiwane, Ranchod and Letsoalo, 2009), except that cohort members in Soweto start having sex a year earlier than national average. The results can also be presented in a graph. Figure 7 shows that by age 18, more than half (52.2%) of the Bt20 children had engaged in sexual intercourse; 17.3% initiated sex when they were 15 years or younger, and 47.8% had not engaged in sex at the time of the study. Figure 7 also shows that sexual activity increases with age for both females and males, with the majority of adolescents becoming sexually active by the time they reach 18 years of age.

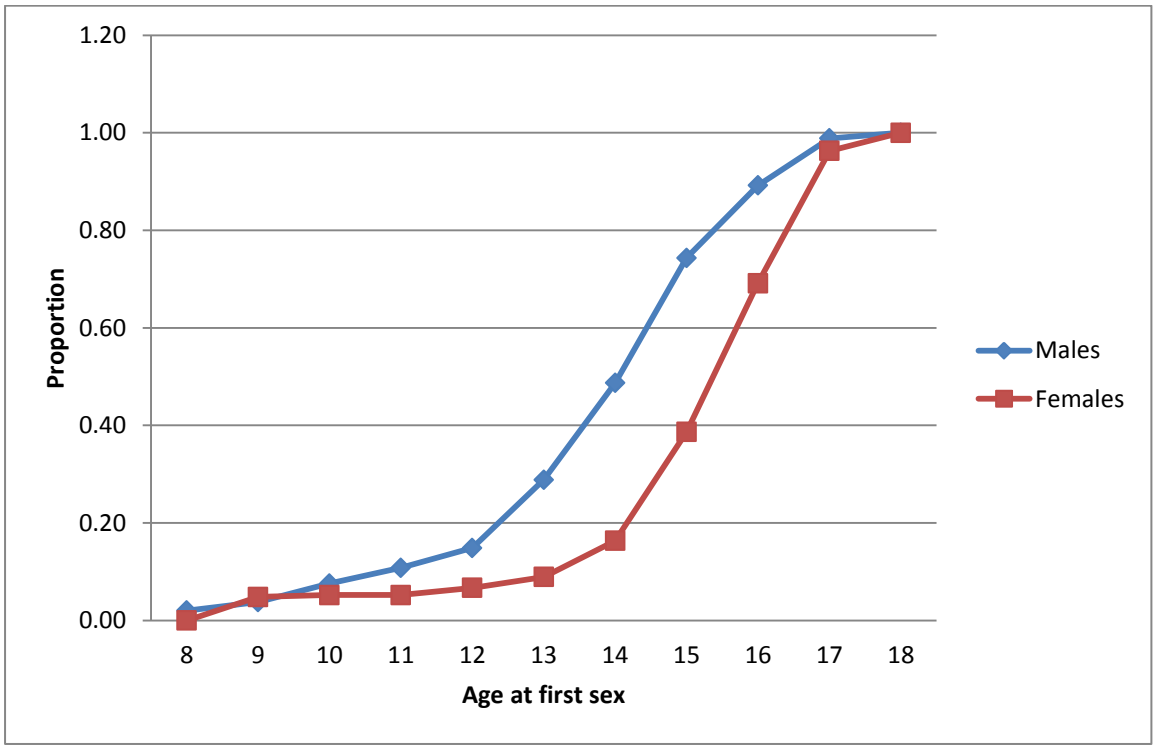


Figure 7: Cumulative proportions of males and females who have engaged in sex by age

Almost three quarters (74%) of the 343 males in this study had already engaged in sex by age 15 years compared to their female counterparts (39% of 269) and by age 16 years, 89.2% of males and 69.1% of females were sexually active.

According to the χ^2 test of independence, the differences between males and females and engagement in sex by age 18 years is statistically significant χ^2 (1, N=1145) = 35.821, p=0.000 (Table 38; Appendix). There is a highly significant relationship between gender and engaging in sexual intercourse. From the mean ages at first sex we can infer that males (14.2 years) are more likely to initiate sex earlier than girls (15.8 years). To compare the two means of age at first sex for both females and males to see if they are significantly different from each other, I conducted an independent sample t-test, which showed the average age at first sex for males (M=14.21, 2.060) was a little lower than (M=15.82, 1.250) for females and the two means were significantly different from each other at t (40.685) =-11.820, p<0.01. We can be 95% confident that the true difference between these means is CI (-1.873,-1.340) (Table 40; Appendix).

4.3 Bivariate analysis results

4.3.1 Mother characteristics and child's gender

The predictor variables under mother characteristics are the mother's education and the age of the mother at the birth of the child.

Table 9: Values of Pearson's χ^2- statistic on cross-classifying mothers' education, gender and mothers' age at birth of child with children's sexual behaviour

Explanatory variables			
Ever had sex	χ^2- value	df	p-values
Age of mother at birth of child (<20yrs)	4.691	1	0.030*
Mother education	7.985	3	0.046*
Gender	35.821	1	0.000**
Earlier age at sexual intercourse			
Age of mother at birth of child (<20yrs)	2.2547	1	0.111
Mother education	4.873	3	0.181
Gender	120.901	1	0.000**

(*) significant at p=0.05, and (**) significant at p=0.010

According to the χ^2 test of independence the P-value (p=0.03) for age of mother at birth of child is significant at 0.05, which means that the null hypothesis is rejected. This suggests that there is association between the age of the mother at birth of the child and the child initiating sexual activities by age 18, but not associated with earlier sexual activity as the p-value is 0.111 (Table 9). The results also show that the mother's education is associated with the child ever having sex but it is not associated with starting sexual activity early. Gender is highly associated with sexual activity by age 18 and age 15 and further analysis will be conducted.

4.3.2 Gender of the child

A two-way ANOVA (Analysis of variance) has been used to test gender interaction with other predictor variables.

4.3.3 Levene's test results

Prior to conducting the two-way ANOVA the homogeneity of variance assumption was tested for all models. Based on a series of Levene's F tests, the homogeneity of variance assumption was violated because the Levene's F tests were statistically significant ($p=0.000$), which is indicative of the fact that the homogeneity of variance assumption is not being met. However, an examination of the standard deviations revealed that the largest standard deviations were not more than four times the size of the corresponding smallest, suggesting that the ANOVA would be robust in this case (Howell, 2007). To avoid committing the type one error only variables significant at $p<0.01$ were selected.

4.4 Testing the interaction between gender and control variables with ANOVA

4.4.1 Age and education of mother at birth of the child

In this test we test if there is a difference in mean ages at first sex between males and females after controlling for the age at which the mother gave birth to the child. This part of analysis is interested in establishing how gender differences impact on sexual behaviour taking into account the age and education of the mother at birth of the child.

4.4.2 Age of the mother at birth of child

The results show that there are differences in ages at which children start sexual activity when controlling for the mother's age at the birth of the child, children born to mothers who were 20 years or younger initiate sexual intercourse much earlier than those born to older mothers. The mean ages at first sex for those born to younger mother is 14.6 years, which are lower than 14.98 years for those born to older mothers. Female children born to younger mothers initiate sex earlier on average at 15.63 years old than those born to older mothers (15.88). Males born to younger mothers start having sex much earlier (13.7 years) compared to those who were not (14.34).

The F ratio found a highly significant effect of gender, F (1,595) = 102.993, p=0.000 (p<0.01), indicating that gender significantly affected the age at which children start sexual activity. There was also a significant main effect of the age of the mother at birth of the child on the age at first sex, F (1,595) = 6.58, p=0.011 (p≤ 0.01) indicating that children who were born to younger mothers are more affected than those who were born to older mothers. However, there was no significant main effect on males and females and age of mother at birth of child on when children start sex, F(1,595)=1.101, p=0.294 (P>0.01) also, which means that the effects of being born to younger mother are the same for male children and for females. This is further illustrated on Figure 8.

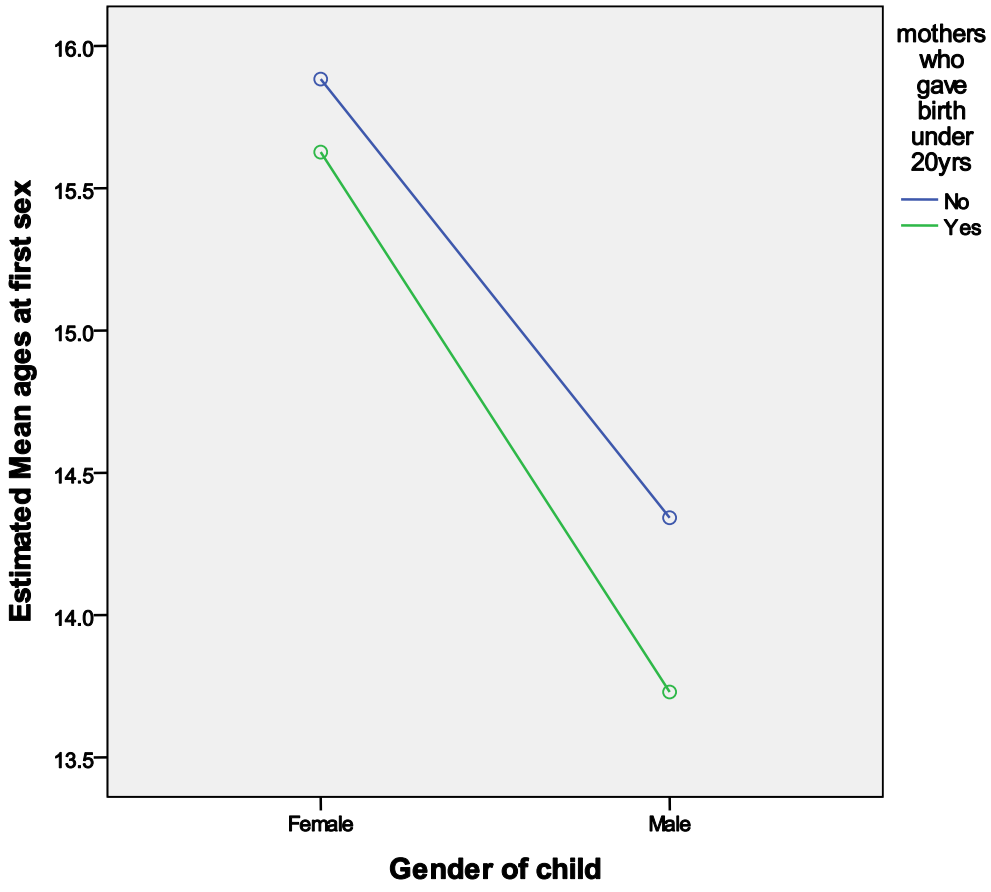


Figure 8: Graph of interaction effect between gender and mother's age at birth of the child

Figure 8 shows that there is no interaction effect on gender since the lines are not intersecting. The analysis demonstrates that although gender and the effects of being born to a younger mother are significant on age at first sex, which also supports the first claim that there is a difference between the mean ages of males and females at first sex. The interaction between gender and age of mother at birth of child is not significant which means that the age of the mother at birth of child affects both males and females the same way.

4.4.3 Mother's education at birth of child

The results show that children born to mothers with secondary education have the lowest mean age at first sex (14.83), followed by mothers with primary education (14.93), then mothers with post-matric education (15.00) and lastly mothers with matric education (15.03). However, the mean differences are not statistically significant. There are differences in mean ages at first sex between boys and girls. Girls born from mothers with matric education have the mean age at first sex of 15.91, which suggest that they start sexual activity later than all the children selected in this study. Boys who delay sexual activity have a mean age at first sex of 14.38 and are born from mothers with post matric education.

4.5 Gender interaction and selected mediating variables

4.5.1 Father support and contact at developmental stages

Here, we test whether the mean ages at first sex for females and males are affected by either father support 0-11 years or father's contact 0-11 years or both. As discussed in literature, father involvement in children's lives buffers the effects that may increase the risk of engaging in earlier sexual intercourse in single mother families. We begin by looking at descriptive statistics of father contact and support 0-5 years and the mean ages at first sex by gender (Table 10).

Table 10: Mean ages at first sex by gender and father support and contact 0-5 years

Gender	Father Contact 0-5 years	Mean age at first sex	Std deviation	N
Female	NO	15.53	1.281	73
	YES	15.93	1.223	183
Male	NO	13.79	2.299	94
	YES	14.37	1.943	249
Total	NO	14.55	2.105	167
	YES	15.05	1.843	432
	Father Support 0-5 years			
Female	NO	15.64	1.201	97
	YES	15.92	1.271	159
Male	NO	13.83	2.343	120
	YES	14.42	1.863	223
Total	NO	14.64	2.117	217
	YES	15.04	1.801	382

Table 10 shows that children who are in contact with and receive financial support from their father between 0 and 5 years tend to delay sexual initiation more than those with no support or contact. To establish if father contact and support (0-5) years and gender interact to affect the age at first sex, we use the ANOVA test. The F ratios were highly significant indicating that gender, $F(1, 595) = 105.808$, $p=0.000$ ($p<0.01$) and father contact (0-5) years, $F(1, 595) = 9.237$ $p=0.002$ ($p<0.01$) individually affected the age at first sex. However, there was a non-significant interaction between gender and father contact (0-5), $F(1, 595) = 0.340$, $p=0.560$ ($p>0.01$) indicating that the main effects of father contact (0-5) years affected males and females equally. The same results held for father support (0-5) years; where father support (0-5) had significant main effects on age at first sex, $F(1, 595) = 8.57$, $p=0.004$ ($p<0.01$) and gender (0-5) showed a significant main effect on age at first sex, $F(1, 595) = 122.824$, $p=0.000$ ($p<0.01$). The results showed that the interaction between gender and father support was yet again not significant, $F(1, 595) = 1.047$, $p=0.307$ ($p>0.01$). Table 11 shows the results for father support and contact (6-11) years. Children who are in contact with and receive financial support from their fathers show higher mean ages at first

sex than those who do not. This indicates that they delay sexual activity compared to their counterparts who are not in contact with and are not receiving support from their fathers.

Table 11 Mean ages at first sex by gender and father support and contact 6-11 years

Gender	Father Contact 6-11 years	Mean	Std deviation	N
Female	NO	15.60	1.235	107
	YES	15.97	1.241	149
Male	NO	13.85	2.174	131
	YES	14.43	1.959	212
Total	NO	14.64	2.007	238
	YES	15.07	1.861	361
	Father Support 6-11 years			
Female	NO	15.65	1.173	130
	YES	15.98	1.308	126
Male	NO	13.94	2.217	163
	YES	14.45	1.880	180
Total	NO	14.70	2.015	293
	YES	15.08	1.830	306

To determine if father contact and support (6-11) years affects the sexual behaviour of both males and females, a two-way ANOVA was conducted and found a main effect of gender, $F(1,595)=124.77$, $p=0.000$ ($P<0.01$), indicating that males initiate sex earlier than females. There was also a main effect of father contact (6-11 years), $F(1,595)=10.407$, $p=0.001$, P ($p<0.01$). This effect showed that children who are in contact with their fathers (6-11) years delay sex longer than those who are not. There was a non-significant interaction between gender and father contact (6-11) years, $F(1,595)=0.458$ $p=0.499$ ($P<0.01$). The effects tests showed that the father contact effects have an equal impact for males and females. This can be further illustrated by the interaction graph effect on Figure 9.

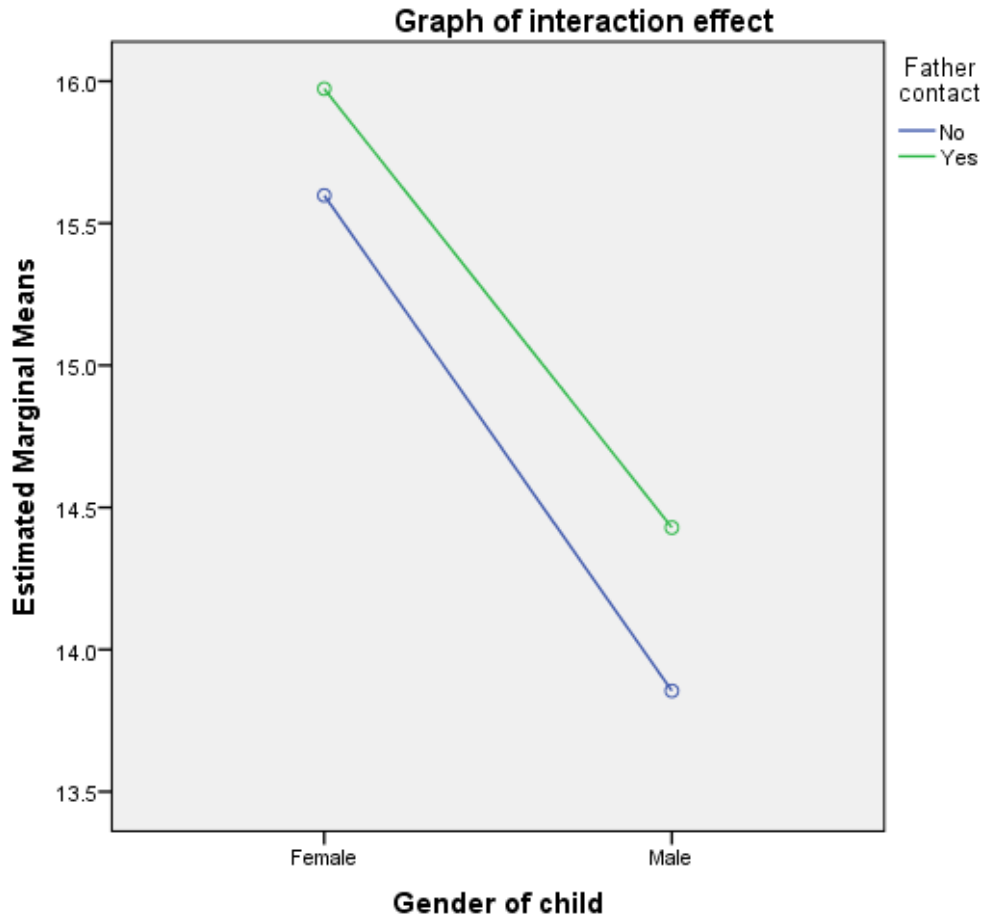


Figure 9: Graph of interaction effect between gender and Father Contact (6-11 years)

The lines show a no-interaction effect between gender and father contact (6-11) years since father contact (6-11) years has been shown to have the same effects on children and their sexual behaviour. Father support (6-11) years was also tested for its effects on children's behaviour. Females and males who receive support from their father delay sexual activity longer than those who do not.

4.5.2 Gender interaction and extended family support

Finally we test whether females who have been supported by other family members before age 5 years are associated with delaying sexual activity compared to their male counter parts. We start by exploring the descriptive statistics, and the results show that from the cohort 37.7% of children who had already started having sex were financially supported by mothers before age 5 years and 36.9% were supported by fathers (Table 12).

Table 12: Mean ages at first sex by gender and extended family support 3-5 years

Gender	Extended family support 3-5 years	Mean	Std deviation	N
Females	Mother	15.88	1.092	93 (15.6)
	Father	15.64	1.349	88(14.7)
	Father/partner and mother	15.81	1.415	26(4.4)
	Mother or father and other family members	16.00	0.966	16(2.7)
	Other family members	16.03	1.402	31(5.2)
	Total (females)	15.81	1.252	254(42.5)
Males	Mother	13.78	2.259	132(22.1)
	Father	14.63	1.888	132(22.1)
	Father/partner and mother	13.86	1.700	35(5.9)
	Mother or father and other family members	15.40	0.843	10(1.7)
	Other family members	14.26	2.093	34(5.9)
	Total (males)	14.2	2.060	343
Total	Mother	14.65	2.133	225 (37.7)
	Father	15.03	1.761	220(36.9)
	Father/partner and mother	14.69	1.849	61(10.2)
	Mother or father and other family members	15.77	0.951	26(4.4)
	Other family members	15.11	1.993	65(10.8)
	Total	14.89	1.931	597

Children who are financially supported by the mother or father together with other family members show the highest mean ages at first sex (15.77), followed by children who are supported by other family members (15.11) before age 5 years. Both females and males tend to delay their sexual activity when the mother or father, with other family members, supports the child financially compared to when the mother is the only support, and this difference is statistically significant at ($p<0.05$). Females (15.88) have higher mean ages than males (13.78) when they are supported by the mother. The second highest mean ages at first sex for males, after mother or father and other family members support are shown, is when only the father supports the child financially.

The two-way ANOVA showed that there is a significant main effect of gender on age at first sex when extended family members are supporting the child before age 5 years, $F(1,587) = 55.511$ $p=0.000$ ($P<0.01$). There was no significant main effect of extended family support,

F (1,587) =2.066 p=0.084, (P>0.01) and gender. However, there was a significant interaction between gender and extended family support (3-5) years. This indicates that the effect of extended family support (3-5) years was different for male participants than it was for females. Post hoc tests show the same pattern of results; the Scheffe tests show that children supported by the mother or father with other family members initiate sex later than those who are supported only by mothers. Figure 10 shows that the mean ages for both females and males when they are supported by the mother or father and other family members are significantly higher than when they are supported by only mothers.

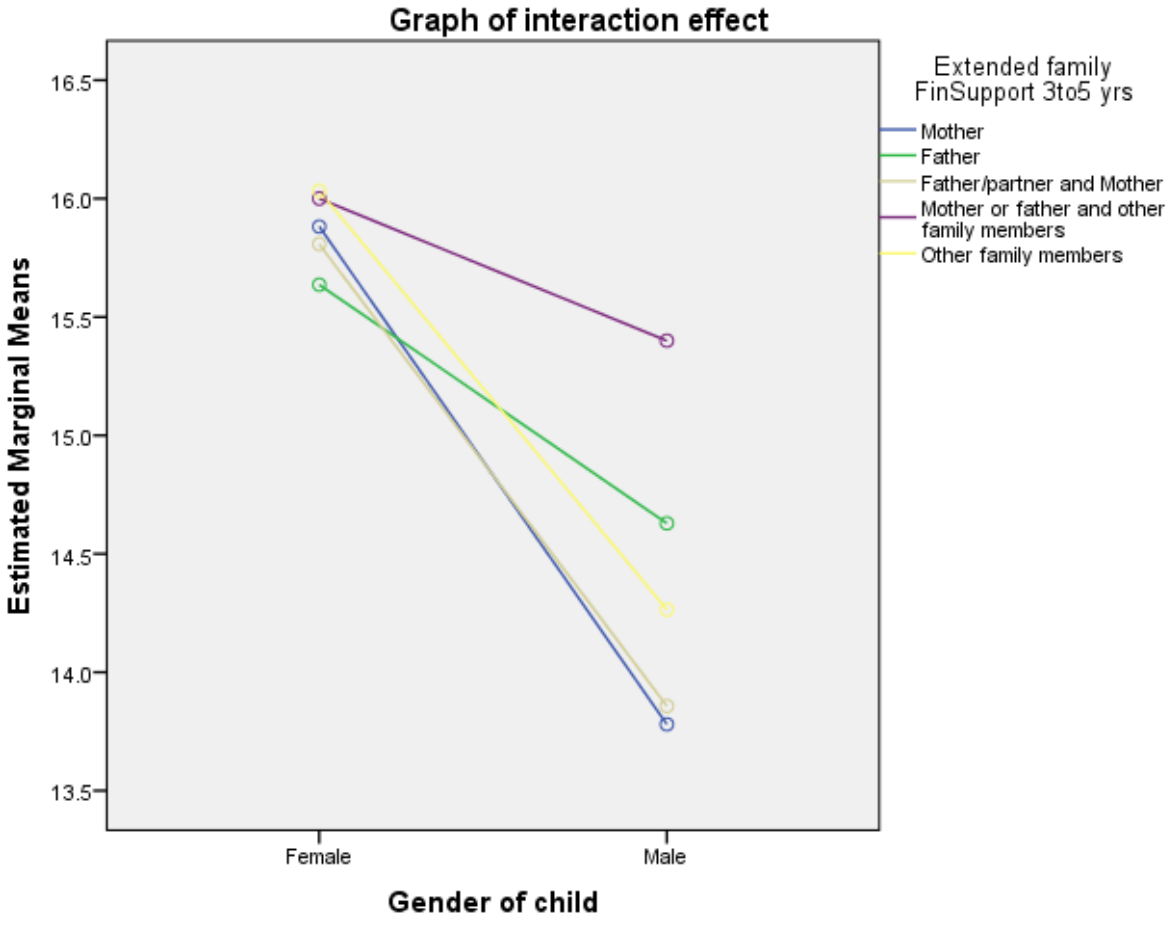


Figure 10: Graphs of interaction effect between gender and extended family support (3-5 years)

Females start engaging in sexual activity much later when they are supported by other family members and there are narrow gaps between mean ages at first sex for females when they are supported by other extended family members than when it is the mother or mother and father. Females seem to have lower mean ages at first sex when only the father supports, which is contrary to boys who delay sexual activity when the father is supporting compared to when the mother supports.

4.6 Mediating factors and children's sexual behaviour

4.6.1 Father involvement as mediating factor

In this section we discuss father contact and support at different developmental stages in relation to the outcome dichotomous variables 'ever had sex by 18 and ever had sex by age 15'. We begin by showing descriptive statistics in Tables 13 and 14 of children who have been in contact with their fathers and their sexual behaviour and later show the bivariate analysis.

Table 13: Father contact by developmental stages and children's sexual behaviour

Father Contact	**Ever had sex by age 18 years**		**Total 100%**	**Age at first sex before age 15years**		**Total 100%**
0-5 years	**YES**	**NO**		**YES**	**NO**	
YES	432(51.1)	414(48.9)	846 (79.9)	237(28)	609(72)	846 (79.9)
NO	167(55.9)	132(44.1)	299 (20.1)	109(36.5)	190(63.5)	299(20.1)
Total	599(52.3)	546(47.7)	1145 (100)	346(30.2)	799(69.8)	1145 (100)
6-11 years						
YES	361(50.1)	360(49.9)	721(63.0)	198(27.5)	523(72.5)	721(63.0)
NO	238(56.1)	186(43.9)	424(37.0)	148(34.9)	276(65.1)	424(37.0)
Total	599 (52.3)	546 (47.7)	1145(100)	346(30.2)	799(69.8)	1145(100)
12-18 years						
YES	299(48.9)	313(51.1)	612 (53.4)	171(27.9)	441(72.1)	612(53.4)
NO	300(56.3)	233(43.7)	533(46.6)	175(32.8)	358(67.2)	533(46.6)
Total	599(52.3)	546(47.7)	1145(100)	346	799	1145(100)

The results generally show that father contact decreases as the children grew older and almost 72% of children who are in contact with their fathers are less likely to engage in earlier sexual activity in all developmental stages. The proportion of children who are in

contact with their fathers and have not initiated sex by age 18 years is higher in late adolescent. Support from the father is also important in children lives. Table 14 shows children who have been receiving financial support from their fathers by developmental stages and their sexual behaviour.

Table 14: Father's financial support by developmental stages and children's sexual behaviour

Father Support	**Ever had sex by age 18 years**		**Total 100%**	**Age at first sex before age 15years**		**Total 100%**
0-5 years	**YES**	**NO**		**YES**	**NO**	
YES	382(50)	382(50)	764(66.7)	212(27.7)	552(72.3)	764(66.7)
NO	217(57)	164(43)	381(33.3)	134(64.8)	247(64.8)	381(33.8)
Total	546(47.7)	599(52.3)	1145(100)	346 (30.2)	799(69.8)	1145(100)
6-11 years						
YES	306(49.4)	314(50.6)	620(54.1)	171(27.6)	449(72.4)	620(54.1)
NO	293(55.8)	232(44.2)	525(45.9)	175(33.3)	350(66.7)	525(45.9)
Total	599(52.3)	546(47.7)	1145(100)	346(30.2)	799(69.8)	1145(100)
12-18 years						
YES	244(47.7)	267(52.3)	511(44.6)	143(28)	368(72)	511(44.6)
NO	355 []	279(44)	634(55.4)	203(32)	431(68)	634(55
Total	599 (52.3)	546(47.7)	1145(100)	346(30.2)	799(69.8)	1145(100)

The highest proportion (66.7%) of fathers who were financially supporting their children at early childhood and over three quarters (79%) of them were in contact at the same stage. Support from the father also diminishes as children grew older. A higher proportion of children who are not supported by their fathers are sexually active than those who are and they are more likely to initiate sex earlier. According to the $\chi 2$ test of independence, father contact at middle and late childhood is significantly associated with children's sexual activity before age 18 years but not associated with earlier sexual initiation (Table 15).

Table 15: Bivariate analysis of father contact and support by developmental stages as mediating factor on children's sexual behaviour

	(1) Ever had sex			2) *Earlier age at sexual intercourse*		
Explanatory variables	χ^2- value	df	p-value	χ^2- value	df	p-value
Father contact 0-5 years	2.031	1	0.154	1.684	1	0.194
Father contact 6-11 years	3.934	1	0.047*	3.572	1	0.059
Father contact 12-18 years	6.303	1	0.012*	1.505	1	0.220
Father contact 0-18 years	5.607	1	0.018*	1.748	1	0.186
Father Support 0-5 years	4.930	1	0.026*	1.811	1	0.178
Father Support 6-11 years	4.748	1	0.029*	2.088	1	0.148
Father Support 12-18 years	7.709	1	0.005*	0.770	1	0.399
Father Support 0-18 years	6.375	1	0.012*	0.703	1	0.402

(*) significant at p=0.05

Regular father contact from the birth of the child until the child is 18 years of age is also associated with the child's engaging in sex by age 18, but not associated with children's earlier sexual initiation. At this stage the direction of the association between father contact and sexual behaviour is not clear and that will be addressed in the next chapter. On the other hand, financial support is important for the child at all developmental stages as it is also associated with the child's engagement in sexual intercourse by age 18 and not associated with earlier sexual initiation. As discussed in literature that father involvement may minimise the chances of children's engaging in earlier sexual intercourse. On the other hand, children who are not financially supported by their fathers at all ages are more likely to engage in sex than those who are supported by their father, and a higher proportion of them is likely to engage in sex earlier than those who receive financial support from their fathers. Moreover, extended family support is also crucial as we know that not all single mothers stay alone; in some instances they stay with other extended family members who are responsible for disciplining the child and providing financial support. Extended family members are able to pool their resources together to support the family and also assist in many ways in raising the child. Tables 16 and 17 show extended family members who are responsible for disciplining the child at early, middle and late childhood; it is unsurprising

that in early childhood almost half the mothers are responsible for setting boundaries, reprimanding or communicating with the child.

Table 16: Extended family discipline at child's age 0-5 years by sexual behaviour

Members of family	Ever had sex by age 18 years		Total 100%	Age at first sex before age 15years		Total 100%
0-2 years	**YES**	**NO**		**YES**	**NO**	
Mother	292(54.7)	242(45.3)	534 (46.8)	104(19.5)	430(80.5)	534(46.8)
Father	111(48.3)	119(51.7)	230 (20.2)	37(16.1)	193(83.9)	230(20.2)
Father/Partner and mother	114(51.4)	108(48.6)	222(20.2)	36(16.2)	186(83.8)	222(20.2)
Father or mother and other family members	51(51.5)	48(48.5)	99(8.6)	14(14.1)	85(85.9)	99(8.6)
Other family members	29(51.8)	27(48.2)	56()	7(12.5)	49(87.5)	56()
Total	597(52.3)	544(47.7)	1141(100)	198(17.4)	943(82.6)	1141(100)
3-5 years						
Mother	287(55.2)	233(44.8)	520(45.6)	105(20.2)	415(79.2)	520(45.6)
Father	107(48.4)	114(51.6)	221(19.4)	36(16.3)	185(83.7)	221(19.4)
Father/Partner and mother	120(51.7)	112(48.3)	232(20.3)	37(15.9)	195(84.1)	232(20.3)
Father or mother and other family members	53(49.5)	54(50.5)	107(9.4)	12(11.2)	95(88.8)	107(9.4)
Other family members	30(49.2)	31(50.8)	61(5.3)	8(13.1)	53(86.9)	61(5.3)
Total	597(52.3)	544(47.7)	1141(100)	198(17.4)	943(82.6)	1141(100)

The participation of other family members in disciplining the child without the involvement one of the biological parents is minimal (5%) in early childhood. A higher proportion of children do not engage in sexual activity by age 18 years when their biological fathers are responsible for discipline in early childhood and almost 16% engage in sex before age 15 years. The same trend is also observed in middle childhood and late childhood in Table 17. Children's discipline seem to improve when the mother or father is assisted by other family members, as more than 80% of children are less likely to engage in sexual activity before age 15 years.

Table 17: Extended family discipline at child's age 6-18 years by sexual behaviour

Members of family	Ever had sex by age 18 years		Total 100%	Age at first sex before age 15years		Total 100%
6-11 years	**YES**	**NO**		**YES**	**NO**	
Mother	298(54.6)	248(45.4)	546	110(20.1)	436(79.9)	546
Father	99(49)	103(51)	202	31(15.3)	171(84.7)	202
Father/Partner and mother	107(48.4)	114(51.6)	221	35(15.8)	186(84.2)	221
Father or mother and other family members	61(54)	52(46)	113	14(12.4)	99(87.6)	113
Other family members	32(54.2)	27(45.8)	59	8(13.6)	51(86.4)	59
Total	597(52.3)	544(47.7)	1141	198(17.4)	943(82.6)	1141
12-18 years						
Mother	331(55.7)	263(44.3)	594	111(18.7)	483(81.3)	594
Father	81(46)	95(54)	176	26(14.8)	150(85.2)	176
Father/Partner and mother	98(47.8)	107(52.2)	205	36(17.6)	169(82.4)	205
Father or mother and other family members	62(54.9)	51(45.1)	113	17(15.0)	96(85)	113
Other family members	25(47.2)	28(52.8)	53	8(15.1)	45(84.9)	53
Total	597(52.3)	544(47.7)	1141	198(17.4)	943(82.6)	1141

From Tables 16 and 17 it is evident that the proportion of mothers who become responsible for discipline increases and on the other hand, the percentages of father involvement decreases as the children get older. Table 18 indicates extended family members' financial support towards the child. The results show that almost a third of mothers were solely financially responsible for their children at early childhood (0-5 years). The number increases to almost half when the children were in their late childhood (Tables 18 and 19). This may be in part explained by the increasing number of fathers who stop child support as their children grow older. The results show that there is a 10% drop in the proportion of men who financially support their children, from 38.8% in early childhood to 28.8% in late childhood.

Table 18: Extended family support at child's age 0-5 years by sexual behaviour

Members of family	Ever had sex by age 18 years		Total 100%	Age at first sex before age 15years		Total 100%
0-2 years	**YES**	**NO**		**YES**	**NO**	
Mother	211(55.1)	172(44.9)	383	79(20.6)	304(79.4)	383
Father	232(52.6)	209(47.4)	441	76(17.2)	365(82.8)	441
Father/Partner and mother	60(44.8)	74(55.2)	134	23(17.2)	111(82.8)	134
Father or mother and other family members	23(56.1)	18(43.9)	41	3(7.3)	38(92.7)	41
Other family members	71(51.4)	67(48.6)	138	17(12.3)	121(87.7)	138
Total	597(52.5)	540(47.5)	1137	198(17.4)	939(82.6)	1137
3-5 years						
Mother	225(56.1)	176(43.9)	401	87(21.7)	314(78.3)	401
Father	220(52.8)	197(47.2)	417	69(16.5)	348(83.5)	417
Father/Partner and mother	61(44.9)	75(55.1)	136	25(18.4)	111(81.6)	136
Father or mother and other family members	26(52)	24(48)	50	1[2]	49(98)	50
Other family members	65(49.2)	67(50.8)	132	16(12.1)	116(87.9)	132
Total	597(52.5)	539(47.5)	1136	198()	938(82.6)	1136

Almost 55% of children did not engage in sexual activity when the father or partner and mother were financially supporting the child in early childhood. Higher proportions (55%) of children who initiate sex by 18 years are supported by their mothers only.

Table 19: Extended family support at child's age 6-18 years by sexual behaviour

Members of family	Ever had sex by age 18 years		Total 100%	Age at first sex before age 15 years		Total 100%
6-11 years	YES	NO		YES	NO	
Mother	253(56.2)	197(43.8)	450	95(21.1)	355(78.9)	450
Father	196(52.1)	180(47.9)	221	59(15.7)	317(84.3)	376
Father/Partner and mother	64(45.4)	77(54.6)	141	26(18.4)	115(81.6)	141
Father or mother and other family members	29(54.7)	24(45.3)	53	3(5.7)	50(94.3)	53
Other family members	53(46.9)	60(53.1)	113	15(13.3)	98(86.7)	113
Total	595(52.5)	538(47.5)	1133	198(17.5)	935(82.5)	1133
12-18 years						
Mother	306(57)	231(43)	537(47.5)	109(20.3)	428(79.7)	537
Father	163(50.2)	162(49.8)	325(28.8)	50(15.4)	275(84.6)	325
Father/Partner and mother	49(41.5)	69(58.5)	118(10.4)	19(16.1)	99(83.9)	118
Father or mother and other family members	26(48.1)	28(51.9)	54(4.8)	4(7.4)	50(92.6)	54
Other family members	49(51)	47(49)	96(8.7)	16(16.7)	80(83.3)	96
Total	593(52.5)	537(47.5)	1130(100)	198(17.5)	932(82.5)	1130

The percentages of other relatives who assist the mother financially to raise the child seem to decrease as the child grows older though there is a very small proportion of relatives who assist the mother or father with financial contributions towards the child in late childhood.

Cross-tabulations shown in Table 20 reflect that extended family discipline is not associated with either children's engagement in sex by 18 years or with earlier engagement in sex at all developmental stages.

Table 20: Extended family financial support and discipline by developmental stages and children's sexual behaviour

	(1)Ever had sex			*Earlier age at sexual intercourse*		
Explanatory variables	χ^2- value	df	p-value	χ^2- value	df	p-value
Extended family discipline 0-2 years	2.829	4	0.587	3.766	4	0.439
Extended family discipline 3-5 years	3.677	4	0.451	6.991	4	0.136
Extended family discipline 6-11 years	3.566	4	0.468	6.425	4	0.170
Extended family discipline 12-18 years	8.089	4	0.088	2.169	4	0.705
Extended family support 0-2 years	4.513	4	0.341	8.162	4	0.086
Extended family support 3-5 years	5.862	4	0.210	16.239	4	0.003*
Extended family support 6-11 years	6.904	4	0.141	11.558	4	0.021*
Extended family support 12-18 years	11,236	4	0.024*	7.927	4	0.094

(*) significant at p=0.05

On the other hand, extended family support between 12 and 18 years is associated with children's engaging in sexual intercourse by 18 years, and extended family support between 3 and 11 years is associated with earlier engagement in sex.

4.7 Socio-economic Status

Socio-economic status is an important variable when discussing children's sexual behaviour as some studies associate lower socio-economic status with earlier sexual activity.

4.7.1 The household wealth index

Table 21 shows all the variables used in the construction of the asset index and results of the PCA.

Table 21: Principal component score

Variable	Mean	Std Deviation	Component Score	N	Variable	Mean	Std Deviation	Component Score	N
Type of home and ownership					**Sanitation facility**				
Shack	0.07	0.255	0.240	1145	Toilet inside house	0.30	0.46	0.736	1145
flat	0.02	0.124	0.024	1145	Toilet outside	0.62	0.486	0.818	1145
House	0.71	0.452	0.577	1145	Bucket system	0.00	0.59	0.016	1145
Shared house	0.05	0.208	0.088	1145	Sole use of toilet	0.72	0.451	0.827	1145
Room	0.06	0.230	0.095	1145	Shared toilet	0.22	0.416	0.873	1145
House owned	0.21	0.405	0.214	1145					
Access to water					**Refuse Disposal**				
Sole use of water	0.73	0.444	0.853	1145	Own garbage bin	0.91	0.286	0.673	1145
Shared use of water	0.21	0.407	0.883	1145	Refuse heap	0.01	0.114	0.064	1145
Indoor hot/cold water	0.26	0.439	0.700	1145	Communal heap	0.01	0.072	0.004	1145
Indoor cold water	0.23	0.423	0.125	1145	Other	0.01	0.093	0.075	1145
Tap water outside	0.45	0.497	0.543	1145					
Other durable goods									
Has electricity	0.9	0.303	0.634	1145					
Has TV	0.69	0.463	0.445	1145					
Has a Car	0.25	0.434	0.201	1145					
Has Fridge	0.66	0.473	0.478	1145					
Has washing Machine	0.09	0.292	0.122	1145					
Has Telephone	0.48	0.500	0.379	1145					

The results of the PCA indicate that the first principal component is 19.6% of the variation in the original variables and each subsequent component explains a decreasing proportion of variance. Scree Plot in Figure 11 shows the proportion of variance explained by each principal component and indicates that the first three components would sufficiently explain the original variables.

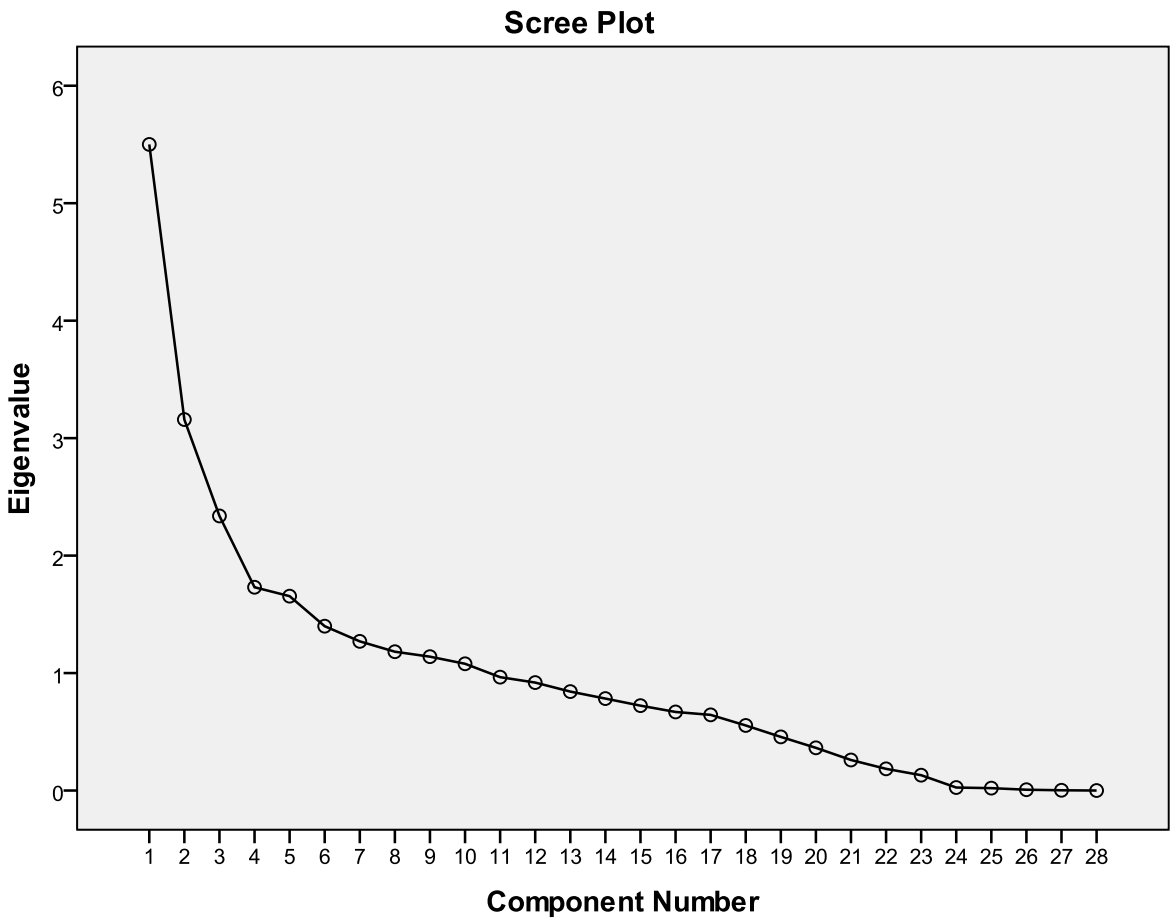


Figure 11: Scree plot

The components 1, 2 and 3 accounted for approximately 19.6 %, 11.3%, 8.34% and 39.3% total variance respectively. Table 22 shows the cross tabulation of household wealth index and outcome variable ever had sexual intercourse and earlier age at sexual initiation.

Table 22: Household wealth index tabulated with ever had sex and early sexual initiation

Explanatory variables			
Ever had sex	χ^2- value	df	p-value
Household wealth index	4.787	2	0.091
Earlier age at sexual intercourse			
Household wealth index	0.186	2	0.911

(*) significant at p=0.05

The results show that there is no association between household wealth index and children engaging in sexual intercourse by age 18 and earlier age at sexual initiation by age 15.

In summary, results from this chapter indicate that there is association between variable ever had sex by 18 years of age with the following predictor variables: gender of child, age and education of mother at birth of child, father contact and support and extended family support. The results further show that there is no association between earlier initiation of sex and the following predictor variables: age and education of mother at birth of the child, and mediator variables; father contact and support and extended family support at certain developmental stages. The gender variable is both associated with sexual behaviour by age 18 and 15. Extended family discipline is not associated with sexual behaviour at any developmental stage and as a result this variable is dropped in the analysis. Further analysis will be discussed in the next chapter.

Chapter 5

Exposure to single mother families and children's sexual behaviour

5.1 Analysis results

In this chapter, we present results from the Kaplan-Meir, Cox regression and logistic regression methods. We attempt to answer research questions and tests hypotheses put forward in chapter 2. We begin by presenting a descriptive and bivariate analysis of exposure variables and outcome variables. The first section presents results on children's status of exposure to single mother families and their sexual behaviour, and the following section focuses on bivariate analysis to test association between exposure variables and sexual behaviour, and lastly we fit models that will allow us to test the hypotheses.

5.2 Descriptive analysis results

For the 18 years of the study some Bt20 children have been partially exposed, which means they have lived in both single mother and two-parent family families with others who remained in either single mother families or in two-parent families over their life course. Table 23 shows children's exposure to single motherhood and their engagement in sexual activity by gender.

Table 23: Children's exposure to single motherhood and their sexual behaviour

	Females		**Males**		**Total**
	Ever had sex by age 18		**Ever had sex by age 18**		
Exposure	**No**	**Yes**	**No**	**Yes**	
Never exposed	120(32.6)	69(18.8)	78(21.2)	101(27.4)	368(32.3)
Partially exposed	138(25.5)	129(23.8)	97(17.9)	177(32.4)	541(47.4)
Fully exposed	71(30.5)	58(25)	39(16.8)	64(27.5)	232(20.3)
Total	329(28.8)	256(22.4)	214(18.8)	342(30)	1141(100)

From the results, it is evident that almost a fifth (20.3%) of children who were born into single mother families has remained there until they were 18 years of age, which means they have been fully exposed to single motherhood. A third has not been exposed to single

mother families as they have spent their entire life in two parent families. Almost half (47.4%) have been partially exposed to single mother families.

According to the analysis on the children's sexual behaviour, the highest percentage (32.4%) of children who have begun having sex are males who have been partially exposed to single mother families (Table 23). A third of females who have never been exposed to single motherhood constitute the highest proportion of those who have not started having sex. The proportion of boys who have started engaging in sex is the same for those who are fully exposed and those who have been never exposed. On the contrary, the highest proportion (30.5%) of children who have not started having sex yet and who have been fully exposed to single motherhood are girls. Male children constitute almost half (16.8%) compared to female children who have not engaged in sexual activity while being fully exposed to single motherhood all their lifetime.

To answer the research question posed earlier on whether children's exposure to single mother families over the life course has an impact on their sexual behaviour, we test the following hypotheses: 1) children who have been fully exposed to single mother families in their life course are associated with engaging in sexual intercourse earlier than those who have not been exposed, 2) boys are more likely to initiate sex earlier than girls, and 3) father contact and support over the life course of children is positively associated with children's well-being. In short, I hypothesize that father involvement mediates the effects of exposure to single mother families on age at sexual engagement.

Exposure to single mother families is categorised into three groups; fully exposed, partially exposed and never exposed to single mother families. Therefore it would be important to find out first if there is a difference in the ages at first sex between children who have been fully exposed, partially exposed and never exposed to single mother families. The two dependent variables are dichotomous; ever had sex by age 18 and ever had sex by age 15. To assess interaction effects between my main predictor variables of interest (exposure to single motherhood) and the outcome variables, I first fit the Kaplan-Meir survival curves to estimate the time (years) children take from birth until they engage in sexual activity (age at first sex) in the presence of those who do not engage in sexual activity during the study (censored cases). The Kaplan-Meir analysis also compares the distribution of ages at first sex

by status of exposure to single mother families. We will then use the Cox regression model to estimate the time to first sexual encounter based upon the values of fitted covariates. Table 24 shows the number of children who have started having sex and those censored and their status of exposure.

Table 24: A comparison of children's sexual behaviour and their status of exposure

Status of exposure	**Total (N)**	**Started Sex (N)**	**%**	**Not sexual active (N) Censored**	**%**
Never exposed	368	170	46.2	198	53.8
Partial exposed	541	306	56.6	235	43.4
Fully exposed	232	122	52.6	110	47.4
Overall comparisons					
	χ^2- value		df	P=Value	
Log Rank (Mantel-Cox)	8.384		2	0.015*	
Breslow (Generalised Wilcoxon)	7.226		2	0.027*	
Tarone-Ware	7.881		2	0.019*	

(*) Significant at p= 0.05

More than half (56.6 %) of children who have been partially exposed and (52.6 %) of those who have been fully exposed have been sexually active compared to 46.2 % of those who have not been exposed during the study. The overall comparison shows us that Log Rank, Breslow and Tarone-Ware are significant at p=0.05, which suggests that we reject the null hypothesis that there is no difference between the survival curves or ages at first sex. Ages at first sex differ with status of exposure. These results can also be shown in figure 12.

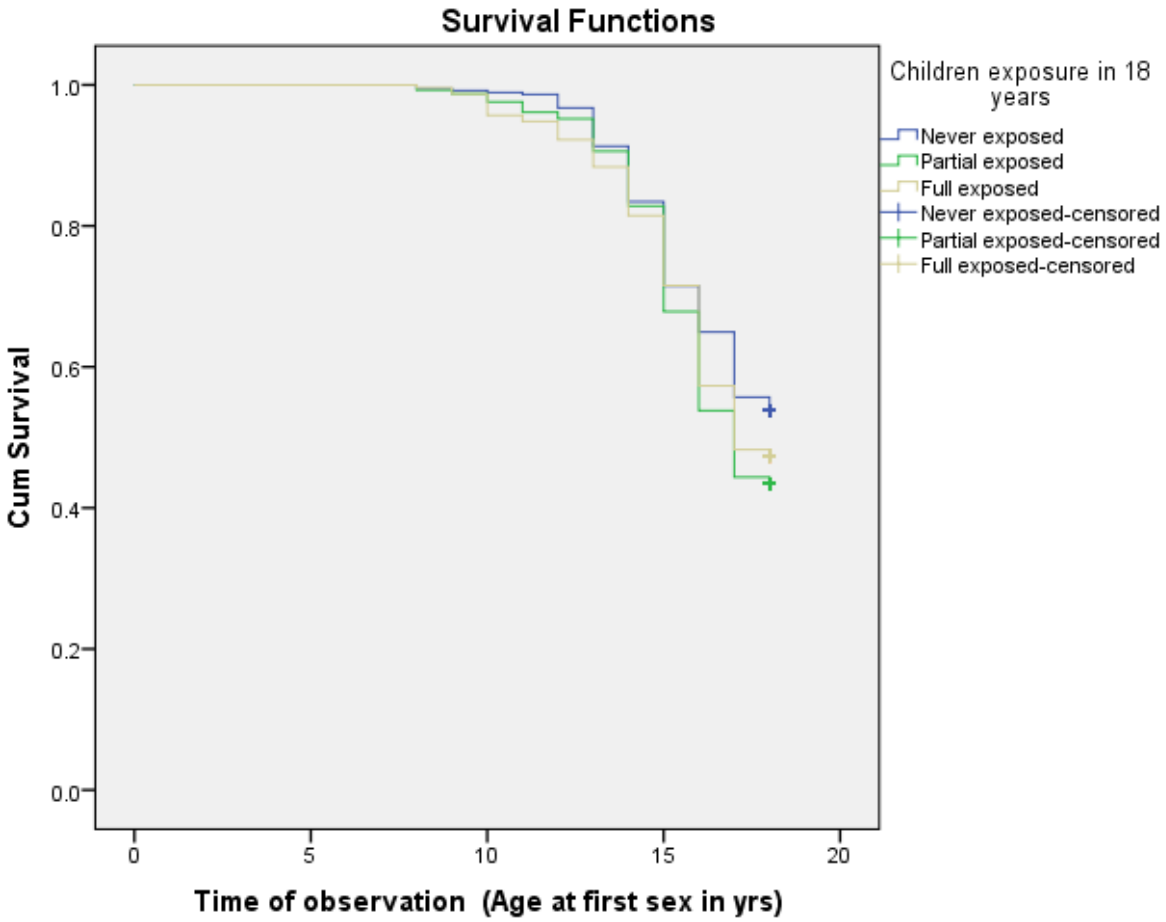


Figure 12: Survival curves for ages at first sex by status of exposure in 18 years.

These results support the first claim that there is a difference between the ages at first sex for children who have been fully, partially and never exposed to a single mother family.

In the next analysis I examine the relationship between each covariate and the time to engaging in sex and calculate the odds of engaging in sexual behaviour. The results are shown in Table 25.

h (Sexual behaviour)$=\beta_0 + \beta_1 (X_i)$ $x_{i\ =\ predictor\ variables}$

Table 25: Results showing the relationship between covariates and odds of engaging in sex in 18 years

Variables	Odds of having sex by age 18 years	Odds of having sex by age 15 years
Control variables		
Exposure Variables		
Full exposure 0-18 years	1.017	1.121
Partial exposure 0-18 years	1.209*	0.998
Never exposed 0-18 years	0.794**	0.924
Status of exposure in 18 years		
Never exposed (reference)	*	NS
Partial exposure	1.296**	1.049
Full exposure	1.188	1.156
Mother education at birth of child	**Odds ratios**	**Odds ratios**
Primary (reference)	*	NS
Secondary	0.887	0.989
Matric	0.716*	0.694
Post Matric training	0.816	0.912
Control variables		
Education at Birth of child	0.889*	0.882
Gender of child	1.893**	6.329**
Age of mother at Birth of child	1.256*	1.315
Household Wealth index		
Low (reference)	-	-
Middle	1.212*	1.035
High	1.133	0.966
Mediating variables		
Father contact and support0-18yrs	0.810**	0.883

*** p<0.05, **p<0.01 reference category for single mother exposure is Never exposed and Primary for mother's education. NS for not significant.**

Table 25 shows that gender is highly associated with the age at which children engage in sexual intercourse. Males are 1.9 times more likely to engage in sexual intercourse by age 18 years than females and are also 6.32 times likely to engage in earlier sexual activity than girls. Children born to younger mothers are more at risk of becoming sexually active before age 18 years than those born to older mothers. The odds of engaging in sexual intercourse for those children who were born to younger mothers are 25.6% higher than those who

were born to mothers who were older than 20 years. However, being born to a younger mother is not associated with sexual activity before age 15 years. Full exposure to single mother families over life course has no significant effect on the children's sexual behaviour by age 18 years and it is also not significantly related to early sexual activity. However, partial exposure to single mother families from birth to 18 years of age increases the odds of children's involvement in sexual activity by 20.9%. The risk of sexual involvement is 20.6% lower for children who have been in two-parent families all their lives and are less likely to start having sex early. Children who have been partially exposed to single mother families show a significantly different sexual behaviour to those who have been never exposed to single mother families. Children who have been partially exposed are 20.9% more likely to engage in sexual activity than those in two parent families. On the other hand, the difference in sexual behaviour between children who have been in two parent families and those fully exposed to single mother families is not statistically significant.

Father involvement in children's lives has been seen as a mediating factor and it reduces the odds of children engaging in sexual activity. According to the results in table 25 father contact and support over the life course reduced the risk of engaging in sexual activity by 19%, and it is not associated with children's engagement in earlier sexual activity. Literature in this study has shown that some studies have associated household wealth and educational attainment of the mother with children's sexual behaviour. However, our bivariate analysis shows that household wealth is not associated with sexual behaviour but the mother's educational attainment is associated with the child's sexual behaviour. The mother's education reduces the risk of engaging in sexual activity by 11% and mothers who have matriculated are significantly different from those mothers with primary or no education in terms of influencing their children's sexual behaviour. Children born to mothers with a matric education are 28.4% less likely to engage in sexual activity than those from mothers with primary or no education. The mother's education is not associated with children's early sexual activity.

To test the two hypotheses we fitted three different models to the data given:

Model 1

h (Sexual behaviour)=β_0 + β_1 (gender) + β_2 (Age of mother at birth of child) + β_3 (Partial exposure 0-18years) + β_4 (Mother's education at birth of child) + β_5 (Partial exposure 0-18years * gender)

Model 2

h (sexual behaviour) =β_0 + β_1 (gender) + β_2 (age of mother at birth of child) + β_3 (education of mother at birth of child) + β_4 (never exposed 0-18 years)

Model 3

h (sexual behaviour) =β_0 + β_1 (gender) + β_2 (age of mother at birth of Child) + β_3 (full exposure 0-18 years) + β_4 (mother's education at birth of child) + β_5 (Father contact and support 0-18 years).

The results of the models shown in Table 26 were arrived at using a Cox regression method.

Table 26: Results of regression models predicting the effect of exposure to single motherhood over life course and ever had sex by age 18 years and 15 years

Variables	**Odds of having sex by age 18**			**Odds of having sex by age 15**		
Single mother exposure	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Partially exposed	**1.318***			**1.165**		
Never exposed	-	**0.809***			**1.004**	
Fully exposed	-		**0.971**			**1.277**
Control variables						
Gender	**2.059****	**1.836****	**1.846****	**7.552****	**6.245****	**6.360****
Age of mother at birth of child	**1.313***	**1.256***	**1.301***	**1.522***	**1.465***	**1.420***
Primary (reference)	*	*	*	-	-	
Secondary	**0.836**	**0.823**	**0.830**	**0.864**	**0.864**	**0.830**
Matric	**0.690****	**0.686****	**0.695****	**0.659**	**0.669**	**0.642**
Post Matric training	**0.823**	**0.824**	**0.830**	**0.912**	**0.916**	**0.921**
Interaction term						
Partial exposure *Gender	**0.788**			**0.675**		
Father involvement						
Father support and contact (0-18 years)	-	-	**0.791****			**0.909**

*** p<0.05, **p<0.01 : NS – not significant**

Model 1 results show that one unit increase in the independent variable (partial exposure 0-18 years) increases the odds of engaging in sexual intercourse for children by 31.8% holding gender, mother's educational attainment and age of mother at birth of child constant. The younger the age of the mother at childbirth increases the perceived odds of the child engaging in sexual activity by 31.3% after controlling for partial exposure, the mother's educational attainment and gender. Moreover, the age of the mother at birth of the child also increases the odds of sexual activity by age 15 by 52% keeping everything constant. Boys are twice more likely to engage in sex by age 18 years and are 7.5 times more likely to initiate sex early than girls when you control for the age of mother at birth of child and partial exposure (0-18). Mother's educational attainment is important in reducing the odds of engaging in sex. Mothers who have matriculated are more likely to reduce the risk of their children initiating sex by 31% than those with primary or no

education, keeping everything constant. Mother's education is not associated with early sexual activity. The interaction between gender and partial exposure improves the model.

Model 2 indicate that children who have never been exposed to single mother families are 19.1% less likely to initiate sex keeping the mother's age at birth of child, gender and mother's education constant. Education of the mother is negatively associated with earlier sexual initiation. Being born to mothers with a matric education reduces the odds of initiating sexual activity by 31.1% controlling for gender and the age of the mother at birth of the child. Even in this model the mother's educational attainment is negatively associated with earlier sexual engagement.

Model 3 shows us that our data does not support the claim that there is a positive relationship between full exposure to single mother families and children's sexual activity, since the relationship is not statistically significant when we control for gender, age of the mother at birth of child, education of the mother at birth of child, and father involvement. The risk of engaging in sexual activity is still two times higher for boys and 6.3 times higher for earlier sexual initiation than girls even when we control for full exposure, education of the mother and father contact and support. The odds of engaging in sex by age 18 are reduced by 20.9% for those children who are in contact with their fathers and get financial support from them, keeping everything constant. Father involvement is not associated with earlier sexual activities.

The overall results do not support the first part of the hypothesis which asserts that when children are fully exposed to single mother families they are more likely to engage in sexual activity. Full exposure to single mother families was found not to be associated with either having sex by age 18 years or by age 15 years. This may mean that our data on full exposure to single mother families cannot account on its own for the sexual behaviour of children. The analysis indicated that partial exposure to single mother family rather than full exposure between birth and 18 years is associated with children engaging in sexual activity. The results also support the theory that if children are in two parent families and not exposed to single mother families the odds of engaging in sexual activity are reduced. Gender of a child was found to be one variable that highly predicts the timing of first sex

and boys are found to be at higher risk than girls. The results also support the claim that father involvement reduces the risks of children engaging in sexual activity for both boys and girls. Father contact and support reduced the risk of a child engaging in sexual activity.

Chapter 6

Duration of exposure to single mother families and sexual behaviour of children

In the previous chapter we discussed exposure to single mother families and children's sexual behaviour and we found that full exposure to single mother families is negatively associated with children's sexual behaviour. In this chapter we focus on the duration of exposure to single mother families. We answer the research question whether the amount of time children spend in single mother families has an impact on their sexual behaviour. We hypothesise that the longer children are exposed to single mother families the more they are likely to engage in sex even when we control for gender. We begin by showing descriptive statistics and bivariate analysis results on duration of exposure and sexual behaviour on table 27.

Table 27: Duration of exposure to single mother family in years and sexual behaviour

Years exposed	**Ever had sex by age 18 years**		**Total (N)**	**Age at first sex before age 15years**		**Total (N)**
	Yes	**No**		**Yes**	**No**	
Not exposed	170(46.1)	199(53.9)	32.2	61(16.5)	306(83.5)	369
1-9	172(55.1)	140(44.9)	27.2	50(16.0)	262(84.0)	312
10-18	135(58.2)	97(41.8)	20.3	44(27.4)	188(72.6)	232
Fully exposed	122(52.6)	110(47.4)	20.3	43(18.5)	189(81.5)	232
Total	599(52.3)	546(47.7)	1145	198(30.2)	947(69.8)	1145
	(1)Ever had sex			**2)** ***Earlier age at sexual intercourse***		
Explanatory variables	χ^2- value	df	p-value	χ^2- value	df	p-value
Years exposed	9.974	3	0.019	1.204	3	0.752

(*) significant at p=0.05

The results show that almost a third of children have never been exposed to single mother families and a fifth have spent all their life in single mother families. Among the 312 children who have spent between 1-9 years in single mother families, more than half (55.1%) have engaged in sex and 16% have engaged in sex by age 15 years. Higher proportions of children who have engaged in sex before age 18 and age 15 years are children who have spent

between 10 and 18 years in single mother families and the other years in two parents' families. These children are said to be partially exposed to single mother families.

To test whether proportions were different in each group in terms of sexual activity by age 18 years, we used a $\chi 2$ test of independence with $\alpha = 0.05$ as criterion for significance. According to the $\chi 2$ tests this difference was statistically significant $\chi 2 = 9.974$, $p=0.019$, so we can infer that children who have spent some years in single mother families have are more likely to engage in sexual activity by 18 years. We tested for earlier sexual activity, the $\chi 2$ results showed that the null hypothesis accepted, $\chi 2$ (3) $=1.204$, $p=0.752$ and we therefore conclude that children who have spent some time in single mother families are not associated with sexual activity by age 15. To test the hypothesis we used logistic regression and fitted data to the model below using the stepwise selection method:

$$\text{Logit [sexual behaviour]} = \beta_0 + \beta_{1\,(}\text{gender)}\ \beta_2\,(\text{Duration of exposure in years})$$

Table 28: Results of logistical models predicting the effect of duration of exposure to single motherhood over life course and ever had sex by age 15 and 18 years

	Odds of having sex by age 18	**Odds of having sex by age 15**	
Duration of exposure	**Model 1**	**Model 2**	
Never exposed (reference)	*	-	
1-9 years exposed	**1.429***	**0.916**	
10-18 years exposed	**1.640****	**1.178**	
19 years (fully exposed)	**0.077**	**1.277**	
Control variables			
Gender	**2.053****	**7.733****	
Goodness of fit	χ^2	***df***	***p***
Hosmer-Lemeshow model 1	**0.214**	**6**	**1.0**
Hosmer-Lemeshow model 2	**1.024**	**6**	**0.985**

*** p<0.05, **p<0.01 reference category for duration of exposure is Never exposed.**

Child's gender and the number of years children spend in single mother families partly explain their sexual behaviour. Children who have spent some time [(1-9 years) and (10-18 years)] in single mother families and the other years spent in two parent families are more likely to engage in sexual activity compared to those children who have not been exposed when we control for gender. This result does support our hypothesis that the longer children are in single mother families they are more likely to engage in sexual activity.

Children who have spent 10-18 years in single mother families are 64% at risk compared to those who have been never exposed. Children who have spent lesser time [1-9 years] are at a lesser risk of 42.9% than those who have never been exposed. On the other hand, children who have been fully exposed to single mother families are not significantly different from those who have been never exposed to single mother families. Despite years of exposure to single mother families, stability in terms of living arrangement for children is important and changes in marital status increases the risk of sexual activity. Years of exposure are not associated with early sexual activity. The Hosmer-Lemeshow goodness of fit is not significant, which is indicative that the model fits the data well.

Chapter 7

Timing of exposure to single mother families and children's sexual behaviour

In this chapter we address the research question that the time at which the exposure to single mother families takes place has more effect on children's sexual behaviour. The first hypotheses states that children who have been exposed to single mother families at early and middle childhood (0-11 years) are more likely to initiate sex earlier than those who have been exposed at late childhood (12-18 years).

The second hypothesis argues that father involvement and extended family financial support at different developmental stages mediates the effects of children engaging in early sexual activities. But before we test the hypotheses, we first present a descriptive summary and bivariate analysis results on the timing of exposure to single mother families and the number of children who have been exposed to single mother families and their sexual behaviour.

Table 29: Proportion of children exposed to single mother families by developmental stages and their sexual behaviour

Exposure by stage	Ever had sex by age 18 years		Total (N)	Ever had sex by age 15 years		Total (N)
Age 0-5	**YES**	**NO**		**YES**	**NO**	
Fully exposed	193(55.3)	156(44.7)	349	108(30.9)	241(69.1)	349
Partially exposed	111(53.6)	96(46.4)	207	65(31.4)	142(68.6)	207
Never exposed	294(50.1)	293(49.9)	587	172(29.3)	415(70.7)	587
Age 6-11						
Fully exposed	205(54.5)	171(45.5)	376	117(31.1)	259(68.9)	376
Partially exposed	110(57.3)	82(42.7)	192	65(33.9)	127(66.1)	192
Never exposed	284(49.3)	292(50.7)	576	164(28.5)	412(71.5)	576
Age 12-18						
Fully exposed	238(55.1)	194(44.9)	432	131(30.3)	301(69.7)	432
Partially exposed	103(46)	81(44)	185	56(30.4)	128(69.6)	184
Never exposed	258(49)	268(51)	526	159(30.2)	367(69.8)	526

At early and middle childhood there are fewer children who have been fully and partially exposed to single mother families combined compared to those who have never been

exposed. This trend changes at late childhood when more children spent more time in fully and partially exposed families than in two-parent families. The analysis results also indicate that generally children who have been fully or partially exposed to single mother's families show a slightly higher proportion of children who engaged in sex by age 18 years compared to those who have not been exposed, at any developmental stage.

A slightly higher proportion of children (6-18 years of age) who were never exposed to single mother families did not engage in sex before they turned 18 years than those who have started sex. When comparing those children who have been partially and fully exposed to single mother families with those who have never been exposed, you find that the higher proportions of children who have engaged in sex are from partially and fully exposed families than from those in two parent families. Almost a third of children from the three families engage in sex by age 15, although those children who have been partially exposed show higher proportions than those in the other two families in all the developmental stages.

Table 30 indicates a cross-tabulation of exposure variables: full exposure, partial exposure and never exposed by developmental stages in 18 years with earlier sexual initiation and engagement in sex by 18 years.

Table 30: Children fully exposed, partially exposed and never exposed to single mother families by developmental stages and their sexual behaviour

	(1)Ever had sex by age 18			2) *Earlier age at sexual intercourse*		
Explanatory variables	χ^2- value	df	p-value	χ^2- value	df	p-value
Fully exposed 0-5 years	1.795	1	0.180	0.623	1	0.430
Fully exposed 6-11 years	1.093	1	0.296	0.99	1	0.320
Fully exposed 12-18 years	2.146	1	0.143	0.729	1	0.393
Fully exposed 0-18 years	0.009	1	0.926	0.729	1	0.575
Partially exposed 0-5 years	0.239	1	0.625	1.811	1	0.547
Partially exposed 6-11 years	2.291	1	0.13	2.088	1	0.558
Partially exposed 12-18 years	0.999	1	0.317	0.770	1	0.833
Partially exposed 0-18 years	7.05	1	0.008*	0.000	1	0.991
Never exposed 0-5years	2.399	1	0.121	0.056	1	0.814
Never exposed 6-11 years	4.206	1	0.040*	1.809	1	0.179
Never exposed 12-18 years	4.158	1	0.041*	0.385	1	0.535
Never exposed 0-18 years	8.139	1	0.004*	0.195	1	0.659

(*) significant at p=0.05

Children's full exposure to single mother families by developmental stages is not associated with initiating sexual intercourse by age 18 years and not associated with earlier initiation of sex by age 15 (Table 30). This observation can be partly explained by fact that full exposure to single mother families may not be the root cause of earlier engagement of children in sexual activities but rather being raised by a single mother may be one of the many factors that increases a child's risk of engaging in earlier sexual intercourse.

Partial exposure of children at developmental stages is not associated with children's sexual behaviour at developmental stages but it is associated with the child's sexual behaviour when the child is partially exposed to a single mother family over their life course (18 years). Partial exposure to single mother families at any developmental stage is not associated with earlier sexual activity. This can be further explained by the fact that if children are exposed to single mother families and two parent families for a shorter period of time at developmental stages this might have less impact on their sexual behaviour than when they are exposed for a reasonably longer period of time. Children who have been in two parents

families between ages 6 and 18 years show an association with sexual behaviour. At this point we can't tell the direction of the relationship. To be in a two parent family between ages 6 and 18 years is not associated with earlier engagement in sexual intercourse. To test the hypotheses we fitted data on three different models using binary logistic regression given by:

Model 1: Logit (sexual behaviour) $=\beta_0 + \beta_1$ (gender) $+ \beta_2$ (Age of mother at birth of Child) + β_3 (full exposure 0-11years) + β_4 (mother's education).

Model 2: Logit (sexual behaviour) $=\beta_0 + \beta_1$ (gender) $+ \beta_2$ (education of mother at birth of Child) + β_3 (Never exposed 0-11 years).

Model 3: Logit (sexual behaviour) $=\beta_0 + \beta_1$ (gender) $+ \beta_2$ (Age of mother at birth of Child) + β_3 (Partial exposure 0-11 years) + β_4 (Partial exposure 0-11 years*Gender) + β_5 (Education of mother at birth of the child).

The results are displayed in table 31.

Table 31: Results of logistical models predicting the effect of timing of exposure to single motherhood at early and middle childhood and ever had sex by age 15 and 18.

	Odds of having sex by age 18			
Status of exposure	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Partially exposed 0-11 years			**1.473***	
Never exposed 0-11 years		**0.746***		
Fully exposed 0-11 years	**0.967**			
Never exposed 0-11 years (reference)*				*
Partially exposed 0-11 years				**1.442***
Fully exposed 0-11 years				**1.243**
Partial exposure*gender			**0.713**	
Control variables				
Gender	**1.979****	**1.976****	**2.188****	**1.972****
Age of mother at birth of child	**1.396***		**1.374***	
Education of mother at birth of child	**0.851***	**0.842***	**0.844***	**0.841***
Goodness of fit (Hosmer-Lemeshow models)				
X^2	**5.746**	**5.703**	**3.585**	**2.805**
df	**7**	**7**	**8**	**8**
p	**0.570**	**0.575**	**0.893**	**0.946**
Status of exposure	**Odds of having sex by age 15**			
Partially exposed 0-11 years			**0.830**	
Never exposed 0-11 years		**0.898**		
Fully exposed 0-11 years	**1.230**			
Never exposed 0-11 years (reference)				-
Partially exposed 0-11 years				**0.986**
Fully exposed 0-11 years				**1.343**
Control variables				
Gender	**7.639****	**7.515****	**7.672****	**7.606****
Age of mother at birth of child	**1.383**		**1.494***	
Education of mother at birth of child	**0.868**	**0.868**		**0.865**
Goodness of fit (Hosmer-Lemeshow models)				
X^2	**2.799**	**6.342**	**9.828**	**5.853**
df	**7**	**8**	**7**	**8**
p	**0.903**	**0.609**	**0.199**	**0.664**

*** p<0.05, **p<0.01 reference category for single mother exposure is Never exposed.**

Model 1 indicates that children who were fully exposed before age 11 years were not associated with sexual initiation by age 18 years when we keep gender and the age of the mother at birth of child constant. Boys are twice as likely to engage in sexual activity as girls

in all models and children born to younger mothers are 1.39 times more likely to engage in sexual activity than those born to older mothers, when controlling for gender, education of the mother at birth of the child and full exposure at birth until age 11 years.

Model 2 shows that children who are in two parent families at early and middle childhood are 23.8% less likely to engage in sexual activity by age 18 when we control for gender and mother's education. Children who have been in two parent families are at a lesser risk of engaging in earlier sexual activity. Education of the mother at birth of the child reduces the risk of engaging in sexual activity by 15.8%, keeping everything constant. Boys are twice more likely to start sexual activity by 18 years and 7.7 times more likely to start earlier sexual activity than girls, controlling for never exposure to single mother families and education of the mother at birth of the child.

Model 3 shows that partial exposure before the child turns 11 years is significantly associated with sexual initiation by age 18 years, when we keep gender and the age of the mother at birth of the child constant. This means that if the child spends some time in a single mother family and in two-parent families this does have much effect on the child's behaviour if it happens before age 11 years. But children who are born to younger mothers are 1.39 times more likely to engage in sexual activity than those who are born to older mothers when we control for partial exposure.

Model 4 shows that the exposure status of the child before age 11 years partly explains the child's sexual behaviour. Children who are partially exposed to single mother families are more susceptible to initiate sex than those in two-parent families when we keep gender and the mother's education constant. On the other hand, the exposure status of the child at early and middle childhood does not explain the child's engagement in sex by age 15 years. Children's exposure status is not associated with initiating sex by age 15 years, although boys are 7.7 times more likely to engage in earlier sex than girls irrespective of their status of exposure. Children born to mothers who were younger than 20 years are 1.4 times likely to engage in sex when we control for partial exposure. The Hosmer-Lemeshow goodness of fit tests is not significant for all models which means that the data was well fitted in the model. Table 32 shows the exposure status of children at late childhood and their sexual behaviour.

Table 32: Results of logistical models predicting the effect of timing of exposure to single motherhood at late childhood and ever had sex by age 15 and 18 years

	Odds of having sex by age 18			
Status of exposure 12-18 years	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Partially exposed	**1.120**			
Never exposed			**0.780***	
Fully exposed		**1.189**		
Never exposed (reference)				*
Partially exposed				**1.442***
Fully exposed				**1.243**
Control variables				
Gender	**1.976****	**1.987****	**2.051****	**1.972****
Age of mother at birth of child	**1.373***	**1.376***		
Education of the mother	**0.849***	**0.852***		**0.841***
Goodness of fit (Hosmer-Lemeshow models)				
χ^2	**6.314**	**5.292**	**0.069**	**1.315**
df	**7**	**8**	**2**	**8**
p	**0.504**	**0.726**	**0.966**	**0.946**

*** p<0.05, **p<0.01 reference category for single mother exposure is Never exposed.**

From the models it is evident that, partial and full exposure to single mother families in late childhood is not associated with their sexual behaviour by 18. Children who are never exposed to single mother families at late childhood are 22% less likely to engage in sex by 18 years. Children who have been partially and fully exposed and born to younger mothers are 1.37 times more likely to engage in sex when controlling for gender and education of the mother at birth of the child. Our results do not support the hypothesis that children who have been fully exposed in early and middle childhood are more likely to engage in sex by age 18 years. This outcome is not unexpected as the data show earlier that full exposure to single motherhood is not associated with sexual behaviour irrespective of what stage of development it happens. On the other hand, children who are in two-parent families at any stage of development are less likely to engage in sex by 18 years and the most vulnerable are children who have been partially exposed to single motherhood. To test the second hypothesis that asserts that father and extended family member involvement in early and middle childhood mediates the effects that encourage children to initiate sexual activity by 15 and 18 years, we fitted different models given by:

Predicted logit of (Sexual behaviour) =β_0 + β_1 (gender) + β_2 (age of the mother at birth of child) + β_3 (father contact and support 0-11) + β_4 (father contact and support 12-18 year)

The Hosmer-Lemeshow goodness of fit shows that the data fits the models well and the results are shown in Table 33. Father contact and support before age 11 years reduces the risk of engaging in sex by 24% when gender and mother's education is kept constant and father contact and support in late childhood reduces the odds of initiating sex by over 30% (Table 33). As late childhood is the time when many children are likely to start sexual activity, father involvement is crucial.

Table 33: Results of logistical models predicting the effect of father involvement early and middle childhood and ever had sex by age 15 and 18 years

	Odds of having sex by age 18		Odds of having sex by age 15	
	Model 1	**Model 2**	**Model 3**	**Model 4**
Father involvement				
Father support and contact 0-11 years	**0.762***		**0.785**	
Father support and contact 12-18 years		**0.698****		**0.867**
Control variables				
Gender	**1.992****	**1.987****	**7.685****	**7.515****
Age of mother at birth of child	**1.341**	**1.370***	-	-
Education of the mother at birth of the child	**0.852***	**0.848***		**0.871**
Goodness of fit (Hosmer-Lemeshow models)				
χ^2	**10.919**	**10.778**	**4.295**	**5.002**
df	**8**	**7**	**7**	**5**
p	**0.206**	**0.149**	**0.745**	**0.544**

*** p<0.05, **p<0.01 reference category for single mother exposure is Never exposed.**

The risk of initiating sex at late childhood for children born to younger mothers is 37% higher than those born to older mothers when controlling for father support and contact, education of mother at birth of the child and gender. On the one hand, father support and contact at any developmental stage is not associated with engaging in sex by age 15 years. On the other hand, models in Table 34 show that extended family support before 11 years is not associated with child sexual behaviour.

Table 34: Results of logistical models predicting the effect of extended family support at early and middle childhood and ever had sex by age 18 years

	Odds of having sex by age 18			
Extended family support (categories)	**0-2 Years**	**3-5 years**	**6-11 years**	**12-18 years**
	Model 1	**Model 2**	**Model 3**	**Model 4**
Mother (reference)	-	-	-	*
Father	**0.902**	**0.873**	**0.821**	**0.736***
Father/Partner and Mother	**0.688**	**0.673**	**0.694**	**0.575****
Father or Mother and other family members	**1.084**	**0.914**	**0.966**	**0.680**
Other family members	**0.716**	**0.647**	**0.583**	**0.712**
Control variables				
Gender	**2.028****	**2.016****	**2.016****	**2.129****
Age of mother at birth of child	**1.462***	**1.480***	**1.499****	**1.424***
Education of the mother at birth of child	**0.848***	**0.851***	**0.853***	-
Goodness of fit (Hosmer-Lemeshow)				
χ^2	9.388	6.897	12.798	**5.244**
df	**8**	**8**	**8**	**8**
p	**0.311**	**0.548**	**0.118**	**0.731**

*** p<0.05, **p<0.01 reference category is Mother for extended family support.**

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Extended family support in late childhood is associated with the child's sexual behaviour. When the father is supporting the child financially the child is less likely to engage in sexual activity than when the mother is the only one supporting the child, controlling for gender, mother education and the age of the mother at birth of the child. If the support comes from the mother and the father or partner the chances of children engaging in sexual activity are 42% lower compared to when the mother is financially supporting the child on her own, keeping gender and age of the mother at birth of the child is kept constant. The younger age of the mother at birth of child increases the odds of initiating sex by more than 42% for those children who are financially supported by extended family members and keeping gender constant.

The results show us that extended family support is associated with the child's earlier sexual initiation. Table 35 indicates that extended family support from birth until the child is 11 years old is significantly associated with child engaging in sex by age 15 and more importantly extended family support between 3 and 11 years. This means that when the

mother and father and other family members are financially supporting the child it reduces the risk of engaging in early sexual activity by more than 78 %.

Table 35: Results of logistical models predicting the effect of extended family support at early and middle childhood and ever had sex by age 15 years

	Odds of having sex by age 15			
Extended family support (categories)	**0-2 Years**	**3-5 years**	**6-11 years**	**12-18 years**
	Model 1	**Model 2**	**Model 3**	**Model 4**
Mother (reference)	*	**	**	*
Father	**0.835**	**0.728**	**0.689**	**0.652***
Father/Partner and Mother	**0.818**	**0.934**	**1.012**	**0.909**
Father or Mother and other family members	**0.321**	**0.080***	**0.225***	**0.276***
Other family members	**0.408****	**0.407****	**0.481***	**0.691**
Control variables				
Gender	**7.851****	**7.757****	**7.929****	**8.000****
Age of mother at birth of child	**1.724***	**1.720***	**1.632***	**1.531***
Education of mother at birth of child				
Goodness of fit (Hosmer-Lemeshow)				
X^2	6.032	4.202	8.141	**3.962**
df	**8**	**8**	**8**	**8**
p	**0.644**	**0.838**	**0.420**	**0.682**

*** p<0.05, **p<0.01 reference category is Mother for extended family support.**

All the models show that extended family support is more effective in reducing the risk of initiating sex by age 15 when the father is financially supporting the child or when the mother or father and other family members are supporting the child than when the mother is the lone supporter. This stresses the importance of father involvement even if there are other extended families members supporting the child. If extended family members are working it may increase the household income and the many adults present better in terms of social control. The results also show that 'Other family members' support, excluding the father and mother, is equally important in early and middle childhood but not in late childhood. The risk of engaging in sex is 8 times greater for boys than girls when they are financially supported by extended family members. This can be

partly explained by that biological parents are crucial in raising children, more importantly when they grow older. The predicted odds of engaging in sexual activity for children born to younger mothers are 1.77 times more than the odds for those children born to older mothers at early and middle childhood, and the odds decrease to 1.53 times at late childhood.

Chapter 8

Discussion and conclusion

This study set out to explore the relationship between exposure to single mother families and adolescent sexual behaviour in Soweto (South Africa). The study sought to establish whether male and female children, who have been fully exposed, partially exposed and never exposed to single mother families, behaved differently from each other and whether the duration of exposure to single mother families or its timing in the developmental life cycle had an impact on age at first sex. It examined whether maternal factors (education and age of the mother at birth of the child) and father and extended family involvement mediated the relationship between exposure to single mother families and children's sexual behaviour. The literature on this subject, specifically in the context of South Africa, is inconclusive on several vital questions pertaining to the timing and duration of exposure to single mother families.

This study is one of the few studies in South Africa to examine the implications for adolescent sexual behaviour (sexual activity by age 18, and early onset of sexual activity by age 15) of growing up with a single mother for both males and females and its strength is its focus on the duration and timing of exposure to single mother families.

8.1 Summary of findings

Table 36 shows the objectives, hypotheses and summary findings of the study.

Table 36: summary findings of the relationship between single mothering and age at first sex

Objectives	Hypotheses	Results
The study investigated The relationship between exposure to single mother families and age at first sex	Children who have been fully exposed to single mother families are likely to engage in sex at an early age: boys are more likely to do so than are girls.	Full exposure to single mother families is not associated with age at first sex at all levels of child development. Partial exposure to single mother families was found to be positively associated with age at first sex. Children who were never exposed to single mother families were less likely to engage in sex early. Boys are twice more likely than girls to engage in sex by age 18 and 7 times more likely to engage in sex by age 15
The pattern of exposure to single mother families over the early life course of children.	Timing: Children who have been fully exposed to single mother families before age 11 have higher chances of initiating sex early than those exposed at late adolescence.	Full exposure to single mother families is negatively associated with age at first sex at all children's developmental stages.
	Duration: The longer children are exposed to single mother families, the earlier they will start having sex.	Children who have spent 9 or more years in single mother families and the other years in two-parent families are more likely to engage in early sexual activities..
The extent to which non-resident father and extended family members'involvement and socio-economic status mediate the relationship	Father contact and support and extended family support over the life course is positively associated with delaying sex.	Children who were in contact with and received financial support from their fathers delayed engaging in sex longer than those who did not. Children who received extended family support at early and late childhood engaged in sex later than those who did not.

Source: Author

The main research question that this thesis sought to answer is whether a relationship exists between exposure to single mother families and age at first sex. We hypothesized that children who have been exposed to single mother families all their lives are more likely to engage in sexual activities at a younger age than those who have not been similarly exposed. The findings of our study contradicted our hypothesis and showed that children who have been in single mother families some of the time are the ones who were at a higher risk of initiating sex by age 15 and 18 than those who have been fully exposed. This is one of the significant findings of this thesis, which provides new knowledge on the relationship between exposure to single mother families and age at first sex.

In addition, the results on the duration and timing of exposure to single mother families offered an insight in this relationship. Children who have spent more time (more than nine years) in single mother families were found to be at a higher risk of initiating sex than children who have spent lesser time (less than nine years). Those children would have spent some time in two-parent families. These results were in support of our hypothesis. Another finding emphasized by the study is the timing of exposure to single mother families. If children are partially exposed at early, middle and late childhood they are more likely to start having sex than those who were never exposed to single mother families and those who were fully exposed to single mother families. Children's full exposure to single mother families at developmental stages did not have a significant effect on age at first sex. This finding was also in contrast to our hypothesis that children who have been fully exposed to single mother families over their life course were more likely to start sex earlier than those in two-parent families. Children who were less likely to engage in sexual activities early or by age 18 years were those who have been in two-parent families all their lives. Children who were in two-parent families seemed to delay sexual activity at all stages of development compared to those who have been partially exposed.

The findings of the study also offered some understanding of the effect of other maternal and paternal mediating factors that were found to be critical in the relationship between exposure to single mother families and children's sexual behaviour. Mother characteristics which were found to be vital in explaining the sexual behaviour of children were education and the age of mother at the birth of the child. The level of education of the mother was

found to be a significant factor when discussing children's sexual behaviour. Children born to mothers who have matric or higher education were less likely to engage in sex by age 18 years than those children born to mothers with primary or no education. Children of educated mothers had lower chances of engaging in sexual activity even if the children have been exposed to single mother families before age 11 and at late childhood. The education of the mother has a significant impact on children's sexual behaviour at all stages of their development and it is not associated with children engaging in sex early (before age 15 years). The effects of being born to a young mother on the age of first sex are insignificant when the mother is highly educated. Children born to mothers younger than 20 years, keeping all factors constant, were more likely to engage in sexual activity than those born to older mothers. And children who have been partially exposed to single mother families at an early age and are born to mothers who were younger than 20 years of age were found to be at a higher risk of initiating sex early.

On the other hand, the study found that non-resident father involvement in children's lives was crucial at all levels of development of the child and mediated the effects of children engaging in sexual activity, which was in agreement with our hypothesis. Father support and contact was found to be crucial for children at all developmental stages irrespective of whether the children has been exposed to single mother families or not. Children who were in contact with their fathers and received financial support from them were more likely to delay sexual initiation than those who were not. Extended family members' discipline was negatively associated with children's sexual behaviour. The impact of the extended families as opposed to Western nuclear families on sexual behaviour has been underscored. Because this study showed that children who received financial support from extended family members delayed sexual initiation. Financial support from extended family members is essential for the children's upbringing more importantly at early and late childhood. The study found that children delayed sexual initiation longer if they were financially supported by their father and other family members at late childhood than when the mother supported the child by herself. The age of the mother is also an important factor when extended family members are expected to offer financial support. Children born to younger mothers are more likely to initiate sex early if the mother is not financially stable and

extended family members are expected to support the child. In such situations boys' chances of initiating sex are 8 times higher than those of girls.

The results of this study showed that the effects of the duration and timing of exposure to single mother families were the same for boys and girls. However, the sex of the child was found to be an important predictor of the child's age of first sex, but the effects of being exposed to single mother families were found to have the same impact for both boys and girls. In support of our hypothesis, the study found that boys were twice more likely to engage in sexual activity by age 18 and 7 times more likely to engage in sex by age 15 than girls keeping everything constant. Boys are twice more likely to engage in sexual activity if they have been partially exposed before age 11 and 7.7 times more likely to engage in sex at an early age than girls. The chances of boys engaging in sex if they have been partially exposed to single mothers at late childhood are two times higher than that of girls.

Socio-economic status of the families was also tested in the study using household possessions and access to services. The household wealth index, which was used as a measure of poverty, was found to have no effect on children's age of first sex in this study. This was contrary to many studies discussed in this thesis. Given the homogeneity of the population under study the measure of poverty lacked significant variation amongst different households.

8.2 Theoretical implications

The two main theories of economic hardship and social control need to be revisited in order to further understand the findings. Proponents of the social control theory argue that the number of adults overseeing a child is crucial in enforcing social control of the child's behaviour (Amato, 1973 and Hill, M, S., Yeung, Wei-Jun, J., Duncan, Greg, J., 2001). Our findings provide some support for this in that children who have been raised in two parent families delayed sexual initiation. However, the results also found that there was no effect of the extended family members' discipline on the children's sexual behaviour, which contradicts the social control theory. One of the reasons to explain this can be that authority exerted by biological parents is likely to be more effective than that of other adults (Hill, *et al.*, 2001).

According to the economic hardship theory female children in single mother families are more susceptible to poverty and therefore use sex as means to achieve their financial and social goals. This study found no relationship between poverty and the age of sexual initiation; this may be partly due to the measure used for poverty in this study. The economic hardship theory is less useful in explaining the relationship between poverty and age at first sex in this study. However, some socioeconomic status proxies (which are mother's educational attainment and the age the mother gave birth to the child) were found to be associated with age at first sex. The economic hardship theory argues that females from poor backgrounds are more likely to fall pregnant early and leave school (Panday et al, 2009; McLanahan and Bumpas, 1988 and Deleire and Kalil, 2002); although this may be true in some contexts, these socioeconomic proxies need to be interpreted with caution because giving birth while at school may have minimal effects on disrupting schooling for girl children as the South African education policy encourages young mothers to continue with their education after giving birth (Grant and Hallman, 2008). Some girls who had received support from family have overcome the drawbacks of falling pregnant and having a child early and gone on to finish school and become successful women. The results have shown that the positive effects of an educated mother on a child's sexual behaviour overcome the effects of having a child at a younger age.

Educational attainment is highly correlated with employment. The more educated the mother is, the higher are the chances of getting a better paying job, which may in turn improve the socioeconomic status of their families. The economic hardship theory argues that children from well off families are less likely to engage in sexual activities early. The findings of this study showed that children born to educated mothers delayed sexual initiation longer than those who were born to less educated mothers regardless of their exposure to, the duration or timing of exposure to single mother families. Less educated mothers may have insufficient knowledge and a lack of role model, or a fear of sensitising their children to sexuality issues compared to their more educated counterparts. Another reason may be cultural concerns, which may inhibit mothers from imparting knowledge about sexuality (Mudhovozi, Ramarumo and Sodi, 2012). Uneducated mothers are less likely to be comfortable talking to their children about sex compared to their educated counterparts (Mudhovozi, Ramarumo and Sodi, 2012). Educated mothers are more likely

to communicate better with their children as boys are better adjusted when they are raised by more educated mothers. However, the social control theory does not adequately account for the parenting factors of educated mothers.

The age of the mother at birth of the child had an impact on children's age on first sex. The study found that children born to younger mothers were at a higher risk of initiating sex at an early age. Taking into account the history of sexual violence where this study was conducted, research conducted in Soweto showed that 12.4% women were coerced into having sex for the first time, and 7.3% at the age of 15 (Dunkle *et al*, 2004). Mothers who have had a child at a young age may find it difficult to impart knowledge about sexuality to their children because of their lack of role modelling. The family of origin where children grow up exerts a strong influence on how children should behave (Kiernan and Diamond, 1983). Parents are a model for their children's sexual attitudes and behaviour (Mott, Fondell, Hu, Kowaleski-Jones andMenaghan, 1996). Apart from parents, the environment children grow up in has an effect on their lives, which can be better described by the disorganisation theory than the economic hardship theory because as children become less answerable to their parents they are more susceptible to peer pressure and the peer group may negatively influence adolescent children.

On the other hand, this study found that the child's sex played a major role in influencing children's sexual behaviour. Boys who have been partially exposed to single mother families were twice more likely to engage in sex by age 18 and 7 times more likely to start sex at age 15 than girls. However, the economic hardship theory associated wealth with girls' sexual behaviour. Girls from well-off families tend to delay sexual activities. The theory found no association between wealth and boys' sexual behaviour. This can be partly explained by the fact that research has shown that boys' sexual behaviour is more likely to be driven by curiosity or sexual experimentation and to prove their power over girls (Madise*, et al.*, 2007).

This study challenges the findings of past studies and reveals that children who have experienced family instability seem to be more vulnerable and more likely to engage in

sexual activities than those who have been fully exposed to single mother families. Most external studies have been conducted in a different setting from the South African context of single motherhood. The extended family nature of South African families may buffer the effects of staying with a single mother. Literature from western countries was found to be less useful in explaining the relationship between single mother families and the sexual behaviour of children in the South African context. This study has provided new knowledge on timing and duration of exposure to single mother families, as few studies have explored its impact on children's sexual behaviour in the South African context. However, this study's results are supported by the work of Amoateng [2004] which found no relationship between single mother families and adolescent sexual behaviour, and are also consistent with research done by Barbarin [1999] on the same children where he found no association between single motherhood and social risks.

8.3 Policy implication

This thesis has shown that family policy needs to respond to new family arrangements. Single mother families or single mother extended families are increasing in society and more children are raised in such families in South Africa. This study addresses one family dimension and one outcome (age at first sex), and although this may provide a partial picture of adolescent sexual behaviour it also provides a potential for intervention during adolescence. It underlines the need to protect young people from indulging in risky sexual encounters that may have negative effect in their lives at adolescence and later life. Sexual behaviour is the main focus because it has implications for schooling through pregnancy related disruptions and HIV and other STI infections, and these health risk behaviours are clearly of substantial policy relevance. To reduce the risk of HIV infection among young people, policy and legislation should ensure that the age of sex and of marriage are not too low. HIV infection and AIDS are major threats to the well-being of young people and in order to curb the spread of HIV it is important to focus on the youth. The National Youth Policy, among others, addresses matters regarding the sexual and reproductive health of young people, and promotes preventative sexual behaviour (HSRC, 2005). Family disruptions have been found to be an important predictor of age at first sex. There is also a need for such policies to pay much attention to the families, especially single mother

extended families, where these young people are raised. This study showed that children who had been in both two parent and single mother families are more likely to engage in sexual activities earlier than other children who had been in two parent families or had stayed with their single mother all the time. It also showed that family stability is more important than family type.

In this study a single mother has been defined as a mother who is neither married nor living with a partner. On the other hand, there is also group of women who are often overlooked by policy makers because of their marital status. Married women whose partners are absent for different reasons are sometimes regarded as de facto single mothers (married with father absent). De facto single mothers' situations are obscured by their marital status and their plight may be similar to those of de jure single mothers. However, in this study there were a few participants who fitted the description of de facto single mothers, which may also be a result of how the question was asked and understood during interviews.

The theoretical arguments for this justification suggest the need for a policy review which will reinforce family functions and focus on child care, child support, and divorce and also support couples form and sustain healthy relationships and enduring marriages. There is also a need for family policy to include enabling economic policies that ensure employment and education, more importantly making the education and employment of women a priority because they support family life. Extreme poverty undermines all functions performed by families and has negative implications for children.

Father and extended family involvement mediated the effects of children engaging in early sexual activity. Despite the fact that fatherhood has not been a policy issue in South Africa (Richter, 2007), fathers need to be encouraged and assisted to be more involved in the lives of their children and to support them financially and emotionally (Richter and Morrell, 2006). There is a need to rejuvenate moral obligations in society that would remind individuals, particularly fathers as leaders, to be responsible for their obligations to their children in order to protect the social order and also to rebuild the social fabric of society by promoting positive norms and values, which make freedom possible.

8.4 Limitations of the study

This retrospective study has offered an evaluative perspective on an important national development policy program, and was conducted in an urban environment that has a history of sexual violence which started during apartheid. As a direct consequence of the location of the study area and methodology used in this study, the study encountered a number of limitations which need to be considered.

The scope for generalising the results to the larger population was limited because the information was provided by a selected group of mothers and their children, that is a small sample size with limited representation. Because the study was also limited to one geographical area it cannot be generalised for children's sexual behaviour in other parts of South Africa.

Retrospective data may suffer from recall bias but a data comparison to check for consistency was done between the retrospective and prospective data, which found that the marital history and socio-demographic information were accurate.

Interviewer bias indicated that most mothers were not forthcoming with information regarding their previous relationships if they were interviewed by a male research assistant. They showed more enthusiasm and openness when they were interviewed by a female research assistant.

The accuracy of reporting on behalf of others may not always be reliable. Mothers reported on information about fathers' involvement, fathers' contact and financial support. There have been some concerns over the validity and reporter bias on the use of mothers' report data on father involvement, more especially when there are post marital conflicts (Coley and Morris, 2002).

Selection bias is a distortion in a measure of association. Selection bias may have occurred in this study because of how a single mother was defined and as result of the procedures used to obtain the population of interest from the sample. Mothers who were living with their children and not staying with a partner were considered to be single mothers. Reasons for this definition are discussed in the literature review and methodology section. Mothers who were not living with their children were not classified as single mothers. It may be possible that some of these mothers were poor or very young and that was the reason they were not staying with their children, which may provide some variation on the

socio-economic status of the respondents. As a result they were excluded from the study. When we tested to what extent our selection was not biased we found that the sexual behaviour of those children who were excluded did not deviate much from the behaviour of those retained in the study as shown in the methodology section in this study.

Another phenomenon that may have contributed to selection bias is attrition. The retrospective data collection managed to interview only 61% of the 3273 mothers and their children who were the baseline at the start of the study, because of attrition. This may have resulted in the loss of sexually active children as most adolescents who had already started having sex were by then staying with their partners and were inaccessible for interviews. This was partly because they had moved to a different location outside the study's boundaries or because the partner did not approve of the interviews. Future research could be conducted to follow up on those children who were staying with caregivers, single fathers and boyfriends and study their sexual behaviour.

There is also a need to interpret sexual data with caution as males are more likely to report a younger age at which they started having sex and overestimate the number sexual partners they have had compared to their female counterparts.

Socio-economic status (SES) was assessed in this study using household possession and access to services but it was found to have little effect on the age of first sex of children. This is because of the criteria of variables used to measure Socio-economic status and better measure would have provided a different conclusion.

8.5 Strength of the study

The use of retrospective data allowed us to observe the changes in children's sexual behaviour over time as opposed to taking snapshots of their lives.

8.6 Recommendation for future research

The scale of this debate is therefore extensive and multifaceted even at the local level. To generate achievable policy strategies and development targets with regards to single mothering and children's sexual behaviour, there is a need for more case studies in different parts of South Africa to allow further assessment of local dimensions of the subject and further research into dynamics associated with adolescent sexual behaviour

and its precursors. Further research could be conducted to determine if the same results would hold in different cultural settings than the Soweto cohort. South Africa is a culturally diverse country and there is a need to test other covariates e.g. religious beliefs and cultural practices in different geographical locations because they are strong determinants of sexual behaviour. Interventions need to target changes in culture and the context in which people make decisions about sexual behaviour. Other recommendations for further research many include exploring support mechanisms for single parents, particularly de facto and de jure single mothers. Studies are needed to explore whether children who have experienced family disruptions are mostly affected by the mother's marital transition from being a single mother to a married mother or from a married mother to a single mother.

Other factors that we would have tested if we had data available were parental supervision, the number of siblings, and the impact of loss of father through death. Exposure to single father families needs to be studied. In addition, the sexual behaviour of children who were not staying with their mothers, for instance those who were staying with caregivers in this cohort, needs to be investigated because they are more likely to have lost at least one of the parents through death. Exploring these other factors as future research strategies can facilitate the attainment of a comprehensive picture in this subject.

8.7 Conclusion

Living with a single mother continuously without marital changes is on its own not associated with children's early sexual debut. This study has highlighted the importance of partial exposure (family instability) rather than living with a single mother as a factor in early adolescent sexual experience.

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Appendix

Table 37: Mothers education level and age of the mother at birth of child

Education level	*Age of Mother at birth of child*		*Total*
	More than 20 years	Less than 20 years	
Less than Matric	743 (89.2)	224(23.2)	967 (100)
More than Matric	90(93.8)	6(6.2)	96
	833	230	1063

Table 38; Average age at first sex of Males and Females born to mothers younger than 20 years old

Age of mother at birth of child		**Males**	**Females**
Less than 20 years	Yes X	13.73	15.63
	SD	2.141	1.391
	NO X	14.34	15.88
	SD	2.025	1.195

Cross-tabulation

Gender

Table 39:

Gender of child * Child have started having sex Cross tabulation

Count

		Child have started having sex		
		No	Yes	Total
Gender of child	Female	330	256	586
	Male	216	343	559
Total		546	599	1145

Table 40

Gender of child * Earlier Age at First Sex Cross tabulation

Count

		Earlier Age at First Sex		
		0	1	Total
Gender of child	Female	555	31	586
	Male	392	167	559
Total		947	198	1145

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	120.901[a]	1	.000		
Continuity Correction[b]	119.188	1	.000		
Likelihood Ratio	130.209	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	120.795	1	.000		
N of Valid Cases	1145				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 96.67.

b. Computed only for a 2x2 table

Mother's age at birth of a child and sexual initiation.

Table 41

mothers who gave birth under 20yrs * Earlier Age at First Sex Cross tabulation

Count

		Earlier Age at First Sex		
		0	1	Total
mothers who gave birth under 20yrs	No	756	148	904
	Yes	191	50	241
Total		947	198	1145

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.547[a]	1	.111		
Continuity Correction[b]	2.250	1	.134		
Likelihood Ratio	2.459	1	.117		
Fisher's Exact Test				.125	.069
Linear-by-Linear Association	2.544	1	.111		
N of Valid Cases	1145				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 41.68.

b. Computed only for a 2x2 table

Table 42: T-Test gender and mean age at first sex.

Group Statistics

	Gender of Child	N	Mean	Std. Deviation	Std. Error Mean
Age First Sex Cleaned	Male	343	14.21	2.060	.111
	Female	256	15.82	1.250	.078

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Age First Sex Cleaned	Equal variances assumed	40.685	.000	-11.051	597	.000	-1.606	.145	-1.892	-1.321
	Equal variances not assumed			-11.820	575.003	.000	-1.606	.136	-1.873	-1.340